The Builder.

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The Paris International Exhibition.

DAY by day the works progress, and completion is nearer. The Paris public are beginning by degrees to believe and to go. Once or twice there has even been an inconvenient crowd at certain points. The flooring of the building, we have omitted to mention, is for the most part of *béton*, on the ground; and there are small pits at intervals, with gratings over them, to receive the dust. It seems to have been the best arrangement possible under the circumstances of the site. A boarded floor on joists would have increased the cost greatly. The flooring is wetted overmuch in the morning for walkers with thin boots: but the right course in this respect will be found out anon. Of the extent to which *béton*, by the way (a hot-water, hand-made, sand concrete, so to speak), is used in France, we spoke last week.

Entering from the Pont d'Iena, on the left-hand side of the avenue, will be seen a Gothic chapel of brick, stone, and cement, with vari-coloured roof, ornamental lead work, and terminal statues. This has been erected at the instance of M. Charles Lévêque, glass-painter, of Beauvais, and originated in the same desire that produced the English architectural court,—a desire to bring together in a prominent position specimens of the various art-works required in architecture. In M. Lévêque's case it is confined to ecclesiastical art, and the idea has been carried out very fully, no fewer than seventy-one individuals and firms,—sculptors, metal-workers, glass-painters, tile-makers, chasers, enamellers,—having co-operated to bring about the result. The organiser had entertained the notion for some years; and when the present exposition was first talked of addressed a memorial to the Imperial Commission proposing the erection and fitting up of a larger and more comprehensive building than in consequence of difficulties that supervened was ultimately put up. He had wished, in the first instance, that the building should display the various styles of architecture, and occupy a large area of ground. The grant of land, however, was gradually reduced, and the building took its present shape. Externally it is very amenable to adverse criticism. Internally it has been fitted in a costly manner; the floor displays various descriptions of pavements, the columns and vaultings are coloured, the window openings are filled with stained glass; each chapel has its altar of elaborate and in some cases elegant design; metal grilles enclose the sanctuary, and carved woodwork, enamelled shrines, polychromed statues, candelabra, seats, organs, fonts, and other church fittings fill up every available site. On another occasion, when the interior is more complete than was the case when we saw it, we may give opinions on the taste and skill displayed by the various exhibitors. For the present suffice it to say that M. Lévêque is entitled, as it seems to us, to great praise for the energy and persistency he has shown in carrying out his scheme. His chief aim is, as he says, to raise the character of the arts applied in the service of the church. About 200,000 francs (8,000*l.*) have been spent upon the chapel, we are told, but the greater part of this will come back, as all but the shell will, of course, be useable elsewhere.

The Tunisians must have spent a great deal of money upon the handsome and characteristic structure they have erected in the Park. It is good both in mass and in details. Within the Exhibition building they have an apartment with its furniture complete, pipe-racks, divan, finely embroidered saddle, and other accessories. Near it are some modelled characteristic groups, including a dromedary and its load.

The copy of a Mexican temple that has been put up has a flight of twenty-eight external steps to the main apartment, and is painted all over with Mexican gods, or devils,—they are much the same. The walls of the upper chamber are covered with figures in high relief (moulded in paper), which are Egyptian, not Mexican. The whole has a made-up and apocryphal air.

The end of the Park next the École Militaire must by no means be left unvisited. Here will be found an extraordinary assemblage of conservatories, garden buildings, summer-houses, and rock-work. One conservatory, with rock-work approach, is particularly ingenious. To the summer-house formed *in cement*, in imitation of stems and branches of trees, we will not give any praise, cleverly as the thing is done. The Venetian blinds covering whole conservatories, from top to bottom outside, are worth notice. There are, we suppose, arrangements to protect them against the effect of wind.

Russia has come out remarkably well. The pictures sent by her and her wooden buildings, we have already alluded to, but we may add a few words as to the latter. The walls of the houses are constructed of round timber, simply stripped of the bark and trimmed with the axe. The ends of the side wall timbers project through those of the front wall. Each piece of timber is halved to receive that which lies across and above it, and has two mortises below to receive the tenons in the halving of the piece below. The halving, the tenons, and the mortises are all produced by the axe alone. On the outside the timbers are left round, but within the rooms these are cut down until only a V-shaped joint is left between the adjoining pieces. No nail or spike is used in the whole construction.

According to a writer in the *Engineer*:—

> "The building of a peasant's house of the plainest kind does not cost, in the neighbourhood of Moscow, Toula, and other great towns, more than 80 to 140 roubles, that is to say, from 12*l.* to 20*l.*, materials, labour, furniture, and stove, all included: the furniture, it should be explained, consists simply of one large table, and benches which stand round the room in the daytime, and form—two put together with a hard mattress on the top—the beds of the family at night, except in the coldest season, when father, mother, and children find a warm corner on the top of the stove, which is nothing more than an oven composed of bricks and faced with ornamental tiles. To explain this extraordinary cheapness the price of wood must be stated. A plank of best fir wood, 21 ft. long, 8½ in. wide, and nearly 2 in. thick, costs 50 copecks, or 17d., and oak is only worth from 2s. 3d. to 3s. 4d. the cubic foot. The wood is very carefully seasoned, being built up in stacks with interstices, and submitted to the action of steam, and is full of turpentine and resinous matters."

The walls of these houses are caulked like the deck of a ship, either with the large moss of Russia, or, where that is not to be obtained, with oakum, and this is driven in with an iron instrument specially adapted to the purpose, and the caulking is dressed with turpentine. Finally the angles are filled in with a cement composed of lime, cow-dung, and coarse flour or meal.

Within the building the Russian domain is marked by a screen of woodwork, similar in character to that seen at the Isbah and other structures in the Park, and suggests Tunbridge ware and the interlocking wood puzzles of our boyhood. Within the Court will be found a very fine and large piece of mosaic work. The design, two groups of the saints of the Russian calendar, is by Professor Neff, of the Academy of the Beaux Arts of St. Petersburg; the mosaics are in enamel, and the effect of the work is truly admirable. The expression of the heads is good, and the colour most harmonious and agreeable. Nothing of the kind equal to it was elsewhere opened when we were there. Some cabinets with the raised mosaic work decorations in which they excel, flowers and fruits, are also very fine: and they send some first-rate photographic portraits, and a mass of malachite in its natural, slaggy state, said to be the largest ever discovered. This looks about 7 ft. long and 3 ft. in diameter in the centre: a portion of it has been polished since it was set up. At the Russian Restaurant, by the bye, where their tea is in great demand, the waiters wear silk tunics of bright colour,—one red, one yellow,—and white trowsers. At some of the restaurants a great business, we may mention, is being done. According to the proprietor's own statement at the French establishment (Gousset's) on the Sunday preceding the opening, 7,000 dinners were served, and on the opening day a larger number still. The kitchen is found much too small, and is wanting in ventilation.

The screen put up in the building by Italy is elegant of its kind, and must have cost a considerable sum of money. So with many of the other nations. The style of that erected by Portugal is their strange mixture of Gothic and Italian. In the machinery zone that country has an enormous trophy of the same character formed of wood and plaster, and rising high into the air.

The productions of Sèvres and Gobelins, china and tapestry, have a court to themselves, and make a splendid whole, though we fail to observe the slightest advance in either; in fact, we can scarcely avoid impression of an apparent decline. We did not observe anywhere, except in the machinery zone, that France has made much advance during the last ten years. Nevertheless, her artistic furniture and other works of luxury maintain a high place. Christofle & Co., for example, have a wonderfully fine centrepiece of silver, for the city of Paris, similar in character, but superior in result to one they exhibited in 1862. A ship in the centre has four figures, carrying a fifth that typifies the city of Paris; and there are other figures at the end, with tritons and river gods. The modelling is of high character. This work was executed from the designs and under the direction of Mr. Baltard, architect, eight sculptors and modellers co-operating. In this way a fine thing may be produced.

It seldom happens when a model of a building is adopted by a manufacturer to show his wares, that the result is endurable. In the case, however, of the trophy set up by Waters & Co., of Manchester, displaying reels and balls of cotton, and which takes the shape of the Manchester Albert Memorial, the spire somewhat enlarged, we have, thanks to the cleverness of James Thomas, their joiner, with help from the architect and a copy of the *Builder*, in which we gave a view of the Memorial, a very agreeable result; so agreeable, indeed, that it has been brought forward by the Executive near to the Norwich gates, so as to be seen from the principal avenue. We can praise both form and colour.

It is but just to say that Messrs. Clark & Co. have completed very satisfactorily their engagement to fix their self-coiling steel shutters to all the entrances to the building; and we may add, as another piece of personal glorification, that

the Emperor has bought from the stand of Messrs. Defries & Son a service of engraved glass. More than one of our manufacturers have already received praises from the imperial lips.

REDEMPTION OF RAILWAY PROPERTY.

THE House of Commons was engaged the other evening in what we cannot call the performance of a comedy, for the comic element was wanting, and there was a deep tragic interest underlying the subject of discussion, but in a display which bore the same relation to farce that humour bears to wit. The honourable member whose name is most intimately connected with the history of the unfortunate and "irrepressible" London, Chatham, and Dover Railway, after having been for some time strenuously urged on in the daily newspapers, at last brought forward a motion for inquiry into certain matters of public notoriety in this sad case, and the business-like unanimity and good feeling that seem to pervade all discussions connected with railway property were evinced by an attempt to fix such a tag to Sir S. M. Peto's motion as should throw a slur on certain other honourable members for their connexion with a perfectly different, though unfortunate, enterprise. The form of the motion was such as to leave little room to reply to the objection raised by the Chancellor of the Exchequer against a proceeding that would afford a precedent for a further extension of the omnifarious occupations of the House of Commons. The temper of the House was such as to evince that every latitude would have been given for a full and detailed personal vindication, had such been attempted, or had such been possible; but the occasion for such a mode of satisfying his friends was not seized by the proposer of the motion. The debate had little result except to show that Torre del Greco is not the only place where people can make merry over the slumbering fires of a dangerous volcano.

While there can be no doubt that any effort to extend the too numerous functions of the House of Commons should be steadily resisted by all who prize the constitutional character of that assembly, and who deprecate its gradual transformation into the likeness of a constituent assembly or a caucus-smothered congress, we yet see cause to regret that no single voice was uplifted, during the course of the debate to which we have referred, to say what most present must have thought, or to point to what all ought to have laboured to do. Whatever amount of blame may be due to any individual in reference to the wanton depreciation of railway property, there is at least one greater culprit, and that is the legislature itself. Common honesty will condemn the men who have induced others to subscribe to railways of which the sole and exclusive object was to enrich the projectors at the cost of the public; but in the eyes of the English commercial morality of the day, which is different from common honesty, such men but act as sharp men of business. But when, to enable projectors to carry out their schemes, the grave sanction of legislative action is required, and when this action, the most responsible duty with which Englishmen can be entrusted, is so freely placed at the command of speculators as to supply them with an Act of Parliament for every five miles of a duplicate railway, the prostitution of legislative power can not be too strongly reprehended. It would have been more becoming for honourable members, in presence of a great calamity, bitterly felt in many a ruined family, to have acknowledged their misdeeds in having created by the laws which they voted a state of almost hopeless confusion, and to have taken the best means in their power to seek to discover a remedy, than to pass lightly over so grave a case even if somewhat irregularly brought before them. "*Amicus Peto—amicus Petrus jucundus—sed major amicus veritas*," was the resolution passed by the House, with the omission of the four final words.

In presence of the helpless indifference of the House of Commons, and of the unquenched party animosity of the leaders of the railway world, the only hope of improvement in the present condition of railway property depends on the exertions of the press. For some time past this fact has been acknowledged with more or less distinctness. It would be idle to speak of the "unerring instinct" of railway proprietors; but, unless the common sense of the great body of owners of railway property be aroused to check the policy of the boards of direction, there is little hope of improvement. We have just seen a memorable example of a check being given by the good sense of individual members of a party to the inconsiderate party spirit of their leaders. In all governments, from the vice-royalty that rules with more than regal pomp (as things go in Europe) over 120,000,000 dusky Asiatics, to the pettiest railway or parish board, the policy of aggression and of extension seems to be normal. One governor-general after another was sent from this country to Calcutta in the earlier days of Indian rule, with express instructions rather to restrict than to extend the limits of English empire; but, as surely as he took his seat in the Government house, did the new-comer carry out the course of conquest that seemed inspired by the air of the place. So it is with railway warfare. Dissentient shareholders have made themselves conspicuous at half-yearly meetings by opposition to the policy of the directors. As individuals, or sometimes *en masse*, they have replaced those whose proceedings they have condemned, but whose policy they have continued to carry out. Unless the real, sound, commercial interest of the dividend to be earned be regarded as a more important question than the rivalry of contending boards, dividends will continue to dwindle and disappear, and directors will continue to congratulate their hungry constituents on important victories.

It is in this state of the case that an influential City authority has urged a scheme of railway federation, and calls out in extremity for "even a Hudson." That sooner or later, under the pressure of Government, or by some caprice of the Legislature, or even by the slowly-awakened conviction of railway shareholders, some scheme of consolidation will be carried out, we have never doubted. That it can be at once, and now, carried out, we fear to be impracticable. So great a step can hardly be taken without previously testing its practicability by some tentative process. It has been, therefore, with a distinct view towards future unity of interest and of action that we suggested the scheme for consolidating the debenture debt that was published in our last number. To that scheme, after mature deliberation, and consultation with men able to form shrewd opinions on the subject, the objections that withstand the execution of more complicated and more sweeping measures, do not, we think, apply. The trustees of the consolidated debenture stock would form a nucleus for consultation and for co-operation, but would not so menace the existing authorities with extinction as to insure their hostility to a man. A step would be taken in the direction of unity; but it would be a step not too precipitate in that direction. The practicability and the advantage of common action would be tested, but no secretary would be swamped, no chairman would be unseated, no existing powers would be annihilated; union would be gradually effected; and unity, if approached, would not be enforced with the strong arm as now suggested.

It has been since the scheme which we suggested was prepared, although before its publication in our columns, that an important portion of its outline has been adopted by several companies, and that with signal success. The result of setting apart a distinct portion of revenue as primarily applicable to the payment of debenture interest has been most satisfactory. When this plan has been adopted by individual companies, the result has been to facilitate the renewal of their debentures. As to the rate at which such renewals have been effected we must wait to be informed; but, in times like the present, renewal at all, on any terms, is a godsend. If such be the effect of a single part of the scheme, applied only to gain temporary relief, what may not be expected from the permanent benefit to be derived from the adoption of the whole, and from the consequent abandonment of the system of the renewals of loans almost *in toto*? It cannot be too distinctly borne in mind by railway proprietors, that their present earnings, properly handled, are enough to give a very fair return on the money. Stop all profligate expenditure, avoid Parliamentary conflict, husband existing resources, and replace the floating debenture debt by permanent 4 per cent. stock, and the result would be this:—4 per cent. for the new stock, 6 per cent. for all preference shareholders, and 3 per cent. for all original shares. This, of course, is a mean. To make it so, not only as matter of figures, but as matter of fact, requires no further outlay of any capital, except of that which is so rare,—the stock of patience and of common sense.

Connected with the future revenue of railways—for as yet we have only spoken of their actual earnings, gross and net—is the important question of the proper character of branch lines. It is in the construction of branches that the greatest loss has been incurred, and that the greatest want of foresight has been shown. It is clear that a town or village deprived of railway accommodation is cut off, to a great extent, from the world. Property in such places is depreciated to a great extent as compared to the value of land in more accessible localities. The country, therefore, demands branches, and each trunk railway, naturally and properly, desires to supply such part of the demand as consists with their own system. But the fatal error has been here. In almost every case the extending company has made, not a branch, but an extension. No traveller, nay, no engineer, not familiar with the district through which he is travelling, can tell whether he is on a main line or a branch. The permanent way and the works of art that are required for the safety of a rapid and heavy through traffic are repeated on the merest country branch—with, perhaps, the sole exception of the use of a single instead of a double track. This great and useless waste of capital is incurred by one simple fault. The class of engine fitted for the one case is used in the other. The *expense* of a railway as far as way is concerned, and to a great extent as far as works are concerned, is *a function of the weight that is put on the driving-wheel of the locomotive*. Limit the weight on the driving-wheel to the weight placed on the carrying-wheels, securing adhesion by a proper adaptation of the locomotive, and a branch becomes a question of 3,000*l*. to 6,000*l*. per mile instead of three times the amount, and a well-considered extension of the system will bring at once lucrative traffic to the railway companies and adequate accommodation to the public.

TILES AND TERRA COTTA.

THERE is an accessible mine, conveying very useful information concerning various building materials—such as building stones, marbles, woods, glass, metals, cements, plasters, manufactured ceramic wares, fireproof floors, bricks, asphalte, slate, &c.,—which appears to us to be little known, or, at all events, but little used. This is in the terra-cotta court and the long gallery by which it is approached, in the South Kensington Museum. We may call attention to this collection as a regular architects' and builders' gallery, full of building contrivances, appliances, and inventions. Many of the objects exhibited in it have been on view for some time; but there are some recent acquisitions in terra cotta which we are about to mention, the more especially as it is at all times a matter of difficulty to find full information as to the extent to which manufacturers have developed the capabilities of this material. Every manufacturer, of course, is ready to forward his price-list on application; but he is not to be expected to furnish any information concerning the wares of his rivals; nor, doubtless, is he aware of the extent of the world-wide competition with which he is surrounded. In this court and gallery there are numerous specimens of English, French, Italian, Danish, Swedish, Austrian, and Australian terra cotta; some glazed, some enamelled in colours, others left *au naturel*; and besides these, there are fragments showing the material in different periods of antiquity, in examples of Old English, Italian, and ancient Roman date.

The capabilities of terra cotta are so elastic that it is scarcely too much to say that "everything and more" might be made of it. Full-length statues, groups of sculpture, busts, and lofty columns are among its triumphs; while mouldings, panels, trusses, archivolts, medallions, friezes, fountains, stoves, candelabra, tracery, shafts for mullions, brackets, finials, chimney-tops, cornices, balustrades, and string-courses, are some of its every-day uses.

The principal difference between ancient and modern terra cotta seems to consist in the fact that the ancients dried their clay in the sun, whereas the modern manufacturer bakes his in kilns at a high temperature. It is, perhaps, needless to say that the term *terra cotta* of the Italian, or *terre cuite* of the French and Belgians, means earth, or clay, baked; and that the modern mode of dealing with it makes it more durable than that pursued by the ancients. To

the potter's clay are added fine sand and pulverized potsherds, all of which are well mixed together with water. At this stage it can be either modelled or cast, the latter process requiring that the consistency of the mass should be reduced to that of thin paste, and that the moulds used should be sufficiently porous to absorb the water. The objects are then dried in the air before being placed in the kiln. When Wedgwood first re-discovered the art of producing ornamental works in clay, it was expected that a large use would be made of this facility to beautify our streets at a moderate cost. The end, so far, has not justified the expectation,—perhaps, to some extent, from the want of the precise information we are now about to offer. We must premise that we shall not be able to give the exact prices of all the articles now manufactured in English or foreign terra cotta, on account of their fluctuation. Foreign and native firms sending specimens have sometimes submitted prices, but when they have received orders after the lapse of three or four seasons, there has been such a considerable variance between those they quoted at the time and those of the present market, that they have discontinued the practice. The exact cost of any of the articles we shall particularize can, of course, be ascertained by communicating with the firm that manufactures them.

The ancient foreign examples serve best to impress us with the nobility of the material. There are several of these in the Museum, in the small cloister courts leading out of the main courts, in the immediate neighbourhood of the ferneries. A Florentine group of the Virgin and Child, executed in the second half of the fifteenth century, standing beneath a niche of floriated architecture, 5 ft. 8 in. high and 3 ft. wide, for which those intrusted with the responsibility of purchases did not refuse to disburse 300*l*., is a fine example of the exaltation with which terra cotta may be treated. Another Virgin and Child, by Jacopo della Guercia, 1420, from the Giglicampana collections, illustrates the same power. Nor is it the fact of the artist being a celebrated master that in any way leads to a high price being set upon this class of work, for the bust portrait of an unknown Flemish gentleman, wearing a flat cap with a doublet of figured damask and a robe bordered with fur, by an unknown sculptor, in the early part of the sixteenth century, was acquired at the large cost of 48*l*.; while the head of a saint, in terra cotta, 1 ft. 8 in. high, second half of the fifteenth century, partly enamelled, a portion of a large composition, the work of Andrea or Lucca della Robbia, cost but 2*l*. There is to be seen here a work in alto relievo of great firmness and delicacy, representing the birth of John the Baptist, ascribed to Lorenzo Ghiberti, 1381-1455; and we may also mention as worthy of note a bas-relief, 2 ft. 4½ in. high and 1 ft. 7 in. wide, of the Virgin and Child, of fifteenth-century Florentine work, which cost 25*l*., in the manner of Desiderio da Settignano; an alto-relievo of the same subject, in its original wooden frame, of fifteenth century Florentine workmanship; and a full-sized bust of our Lord, with the drapery and crown of thorns enamelled, ascribed to Lucca della Robbia. The facility with which the last-mentioned artist embodied his thoughts in this material is further shown in a bas-relief of a monk writing. In the great south court, beneath a richly ornamented marble-arched altar recess, are four figures, full-sized, representing the Pieta where the dead Christ on the Virgin's knees is shown in a manner at once touching and masterly. This group cost 150*l*. Of classical and general subjects there are numerous examples of groups intended for fountains; two amorini bearing dolphins, 2 ft. 1½ in. high, of sixteenth-century workmanship, purchased for 10*l*., and two nude boys of the same period being noticeable among them. The fine massive head of a lion, of fifteenth-century workmanship, ascribed to Andrea del Verrochio, indicates quite another field for the use of the material. The great name of Michelangelo has also fallen upon terra-cotta. A colossal hand, known as Michelangelo's hand, 10 in. high, has been acquired from the Gherandine collection, and several of the great master's works have been reduced, by his admirers, in this material; as in the instances of the group of the Pieta, a contemporary Italian reduced copy of the original, in St. Peter's, Rome, purchased for 16*l*., and a statuette model of his figure of Jeremiah in the Sistine Chapel. Bassi relievo in terra-cotta were much used in the cinque-cento and preceding centuries. To Geo. Bologna is attributed a sketch of the "Rape of the Sabines," 2 ft. 10 in. wide, by 2 ft. high, which may be seen in one of the cases of the richly-stored courts whose contents we are now mentioning as evidences of the versatility of the material. The very delicate manipulation of a full-length figure of St. Catherine having a nimbus with a legend on a scroll upon it, holding in her right hand a wheel and in her left a sword, 1 ft. 3 in. high, by 8½ in. wide, presented by Mr. G. K. Moreland, sends into strong contrast the bold manner of such busts as that of the Duke of Lorraine, 1 ft. 6 in. high, of eighteenth-century workmanship, which was valued by its last owner at 18*l*. Delicacy of treatment has its admirers as well as the more powerful mannerisms, as we may note by the prices given for the objects which exhibit it with any degree of superiority. A small French statuette, by Clodion, most minutely treated, of a fawn running away, only 17 in. high, of the second half of eighteenth century workmanship, cost 42*l*.; another, 2 ft. 6 in. high, of St. Sebastian, date 1490, 8*l*.; and another of St. Jerome, 1 ft. 6 in. high, Italian seventeenth century, 6*l*. Around the principal innermost courts is a series of modern brackets, fixed to the pillars of the arches, on which are placed busts, all, until minute examination is made, of similar merit and of equal antiquity, but in reality of curious difference in value,—one of an aged emaciated man costing 2*l*. 15*s*., and another as much as 68*l*. Another terra-cotta bust, not in this series, deserves especial mention for the curiosity of its subject, which is that of an immensely stout lady, belonging to the Lupari family, 1461. It is painted.

Beginning now, however, at the foot of the ladder with the humble modern pantile, we perceive that foreign manufacturers are in the field armed *cap à pied* with enterprise and taste. It is needless to say that the clumsy, heavy pantiles that cover so many of our homesteads with red ripples are not their models. From force of long association of idea, some people have arrived at a conviction that the ruddy clay ripplets in question are picturesque; but they have only to look upon the foreign ones to unsettle their minds on this point; or, perhaps, we should say, receive a directly-contrary impression. The nearest in form to them, though not in tint, are the pale, sad-coloured Spanish tiles manufactured by Vickman & Co., Seville. These are 9½ in. wide, and 1 ft. 2 in. long, and are placed in rows forming similar corrugated lines to the English pantile; but the difference in colour, and the addition of conical caps 1 ft. 7 in. in length, tapering from a base 7 in. wide, clearly mark their foreign origin. The Belgians have a curved tile something like this, only of a smaller size, which is used with the recurrence of the conical caps at intervals. *Tegole Belghe* are also made in black, red, and coarse grey colours by MM. Josson & De Langes, Niel, d'Anvers. A spade-formed tile, pointed at its base, with a raised ridge down its centre, having a sort of terminal raised arrow-head as an ornamentation, measuring 1 ft. 3 in. in length, and 11 in. wide, is manufactured by them in black, and in a greyish black, as well as in red, at an expense of 70 francs le millier; and the same ogee-formed tile measuring 11 in. by 7½ in. is made both in black and red for a price of 40 francs the thousand. A convex pantile, measuring 11 in. by 8 in., with straight lines at the edges, is also made in the three colours mentioned above, the black, weighing 2,030 kilos. the thousand (price 75 francs per thousand); the red, 1,780 kilos. (price 100 francs per thousand); the coarse grey, 1,900 kilos. (price 50 francs per thousand). A concave tile, measuring 1 ft. by 9½ in., is also manufactured by the same firm in black and in red; as also *tuiles faîtières*, or ridge-tiles, in blue and mixed tints.

A Neapolitan manufacturer, Sig. P. Carafa di Noia, Naples, exhibits in the long gallery of building materials a set of tiles showing the differences between those of England, France, Belgium, Rome, Italy, and Naples. He selects a plain square tile as a specimen of our English make; and chooses from Belgium varieties that which nearest approaches our common curved and scrolled pantile. The Italian tile has the angles of base scalloped, and measures 1 ft. 4 in. by 7 in. The Neapolitan tile is corrugated and rolled; and the Roman flat and rolled. Sig. Carafa di Noia does not supplement his otherwise comprehensive and interesting display of nationalities in *tegoli* with a price list. He is not the only Neapolitan manufacturer. Sig. F. G. Colonesse, Naples, exhibits an ornamental roof tile of what he calls a French pattern, 1 ft. 3 in. in length by 9 in. in width, which is furnished with a bold ridge at one side with which to overlap its neighbour, and a boldly-raised diamond ornament on the centre. The angles of the base are scalloped off. A Parmese manufacturer, Sig. P. Rondain, Parma, shows us a graceful cream-coloured tile, 1 ft. 3 in. in length by 9½ in. in breadth, which has a raised flat ridge to each with which to overlap each other; it is scalloped on the edge and has a boldly-raised ridged lozenge-formed pattern on the centre of each. Signori Leoncini, Brothers, Rotta, Pisa, contrast this with some large flat red tiles which overlap each other at the joints vertically, 1 ft. 5 in. long by 1 ft. 2 in. wide, furnished with tapering rolled caps, 6½ in. wide at the base; and show a ventilating dormer projecting from one of the flat surfaces. As these specimens were originally sent to this country as samples only of Italian manufactures for the International Exhibition they have not been selected with any view to their fitness for this especial climate, nevertheless there are many purposes for which they would be useful as well as ornamental. The roof of the training-school attached to the museum is covered with an Italian tile manufactured by Brown, of Surbiton. It consists of vertical rolls, like draining pipes, alternating with flat tiles, somewhat resembling those of Signori Leoncini. There is no ridge; and it has the appearance of the rolls of a lead roof, recurring much more frequently, and being of a larger size. The present effect as to colour suggests that they are somewhat porous, as they are reddish with a green tinge here and there as though with lichens. The sides of the dormers in this roof are covered with small flat tiles with ornamented edges.

The French manufacturer who exhibits the most specimens is M. A. Courtois, 148, Rue St. Lazare, Paris. One of his tiles bears his own name, and is known as the "tile courtois." The effect of it, when grouped in its place, is at once simple and pleasing, having the appearance of a series of diamond-shaped scales. He states that each one weighs 4·5 lb., and 180 of them are required for a square of 100 superficial feet, making a weight of 810 lb. for that amount of covering, the expense of which is 44*s*. It is a flat tile, 1 ft. 4 in. square, placed cornerways, having a raised rim round two sides of it, and a turned-up clip between them, and a turned-down edge to the other two sides, with a turned-down clip at the angle between them, by which a hold is gained by each tile upon the next. A lozenge tile manufactured by M. Burdin, of Lyons, is highly ornamented. It is thin and light, the single tile weighing scarcely more than the "tile courtois," though more complicated in form, and ornamented by a rib along its centre, and a tongue formed. A square weighs 770 lb. It is made, however, in three dimensions, running 150, 250, and 350 tiles to the square, and costing 6*l*., 3*l*. 12*s*. 6*d*., and 3*l*. 4*s*. the thousand tiles, according to those sizes; or 18*s*. the square for the first two, and 22*s*. 6*d*. for the smallest. The colour is a dull red. MM. E. Muller & Co., of Paris, engraft upon the manufacture of tiles a system of ventilation. They not only provide a covering, but they make provision for the introduction of open and fixed ventilation tiles and skylights, and manufactured tiles as a flashing to chimneys. To describe their tile in the words of its exhibitors, it "has the fillets or flanges along its lower edge slightly returned parallel to the face of the tile; this return being locked into a corresponding recess in the tile next below it, more effectually secures it from the action of the wind, and at the same time gives a watertight joint without the necessity of a high pitch. The longitudinal joint is formed by two small fillets on the face of the one tile fitting into two grooves in the reverse of the next, thus being secured by three edges lapping over two." 150 of these tiles go to cover a square, which weigh 850 lb. The roof of the Sheepshanks Gallery is covered with the "tile courtois."

There is a scaly tile made in plates, having nine scales upon each tile, which is manufactured by Faconnet, Chevalier, & Co., 52, Rue de Transit Vauregard, Paris. Each tile is flat and diamond-formed, the scales standing up about a sixteenth of an inch; and the measurement is 1 ft. 3 in. in length and 1 ft. in width. They are made to hook on to the roof, each tile being simply rabbeted into each other and bedded in mortar; they are 1½ in. in thickness. There are few purposes for which these would be preferable to those that overlap; but they are, doubtless, intended as an improved mode of procuring the effect of miniature tiles. M. Gastellier, Montan-

faust, Seine et Marne, manufactures a flat red tile pierced with two holes, with a slightly raised ornament on it. An Austrian tile shown exhibits the peculiarity of being glazed on half of its extent, the half that is covered by the tile that is destined to overlap it being left unglazed for economy's sake.

There are three makes of ridge tiles, besides their immense variety of pattern; the first and most general of these being cast in the solid in lengths; the second having the ornament only cast into lengths, which fit into grooves prepared to receive them; while the third provides sockets, into which each upright ornament on the ridge is inserted. As the latter would be liable to be loosened in windy weather, it seems that either of the former would be preferable, except for the facility with which those placed in sockets could be replaced without any disturbance of the ridge in case of injury to them. R. Langley, East Cowes Park, Isle of Wight, manufactures, in red and yellow, lengths of ridge tiles having three well-formed fleurs-de-lys on the apex, in the solid. He also manufactures the small 11 in. by 6¼ in. tiles with ornamented edges, which are thinner and therefore lighter than the usual make. The grooved ridge tiles for ornamental purposes are manufactured in red, green, and terra-metallic, by Robert Brown, Surbiton, as are those in which each ornament is placed in a separate socket. Thomas Peake, Tileries, Tunstall, Stafford, makes a strong ridge tile, having little pyramids on its summit, cast in the solid. He also makes lapped and grooved varieties.

Passing on to objects more removed from the sky-line, we will indicate some of the specimens of these to be seen in the modern terra-cotta court. In the centre of this compartment stand two lofty ornamented columns, examples of those used in the south arcades of the Royal Horticultural Society's Garden, on either side of a fountain, with a group of sculpture on a pedestal, rising out of the tazza, by Minton. A second fountain, with a group of two boys holding up a cup, by A. Carrier, Paris, price 80*l*., is another striking object. Around are grouped some fine statues, notably a beautiful Bather, of a yellow tone, for which 52*l*. 10*s*. was not withheld; a bust of Rossini, by M. A. Carrier, Paris, priced 32*l*.; another of Newton, with some disparity, or by some good bargain, priced 10*l*.; and a full-sized erect and draped figure of Galileo, in the usual reddish tint of the material, by Sig. Boni, Milan; and close by is an enormously large slab of Dura marble, which serves as the base of a case containing small fine, delicate specimens of works in terra-cotta. Of these a lovely little statuette of Night, which cost 15*l*., deserves especial examination. On the front of the gallery which crosses one end of the court are two medallions, representing Summer and Winter, by Devers, Paris. On the walls, and on the ground-space immediately in front of them, are displayed productions in terra-cotta by manufacturers from most European countries, those of our own makers, a handsome vase from Australia, and numerous examples of Chinese work.

Some of the Swedish clay used for terra-cotta is white, and this, when glazed, very much resembles the effect of porcelain. There are some fine examples of it in the court. The colour of Danish terra-cotta is similar to that of our own. Several objects, especially some ornamental capitals by C. Vidal, Forsight and Rensing, illustrate this resemblance. Prussian terra-cotta is represented in a Corinthian capital, 1 ft. 8 in. high, by E. March, Charlottenberg, Berlin. It is of a lighter colour than the Danish. M. Boni, Milan, has made very successful attempts to produce highly ornamental work in this material, which a panel for a pilaster, priced 25*s*., a good-looking twist-moulding at 20d. the yard, trusses, fragments of friezes, and samples of archivolts, illustrate. Stoves made in terra-cotta are improvements in appearance for green-house purposes to those in cast-iron. Signori Purlani & Co., Florence, show stoves of a pedestal form, ornamented with wreaths, on square bases, about 3 ft. high, which are priced at 25 francs. Ferneries have been thought of by English manufacturers in connexion with terra-cotta; and a red brick, 18 in. square, with a hollow in the centre with a drain in it, called the Watsonian brick, for growing ferns and building oramental works for ferneries, is shown by F. & G. Rosher, Swan Wharf, Chelsea. The same idea is produced in a smaller brick of a Gothic pattern by the same makers. The hollow is destined to receive earth and the root of the fern. Terra-cotta flower-boxes for window-sills are shown by Clay & Co., Bishop Waltham. To return to indoor objects, candelabra come out well. A fine specimen in this court, by Blashfield, looks worth its cost, 15*l*. 15*s*. Chimney-pieces are good vehicles for the material, some of the French samples being magnificent works. The Renaissance style is very happily compassed by terra-cotta. A copy of an antique chimney-piece in this style, by M. Virebent, Toulouse, is admirable; and the doorway leading into the court, with caryatides, is another fine specimen of the capabilities of his manufactory. An ornamental window, with cornice and string-course, indicates resources as complete in the possession of M. Garnaud, Paris. The whole of the tracery of a double-light window is shown, in four different patterns, in one casting, by Louis Thomson, Wisbeach. The Chinese samples consist of tiles and caps, with ornamented glazed ends, parapets and ridges glazed, balcony fronts glazed and unglazed.

Two medallions in terra-cotta, by Wedgwood, bought at the De la Rue sale for 5*l*. and 5*l*. 10*s*. a-piece, have been quite recently added to the contents of the Museum. The first of these has a group, in high relief, of a Centaur and Bacchante; and the second a group, also in high relief, of Cupid on a dolphin, bearing a letter to Polyphemus. Both are after the Herculaneum fresco. After looking at larger works for constructional purposes, these curiously exemplify the extremes of boldness and exquisite delicacy with which it is competent to treat this durable and not costly material. Under a glass case in the South Court are some additional works, without mention of which a notice of the capabilities and realizations of terra-cotta would be incomplete. These are some minute objects of modern English manufacture of great finish:—A vase and cover; Diana and Actæon, diameter 5¾ in., priced 3*l*. 3*s*., modelled by Wills, Brothers; and a group of Titania and Bottom, by the same artists, 5*l*. 5*s*., which compare not disadvantageously with the last-century work. by Clodion, of a fawn running away, which we mentioned above as a sample of fine finish, purchased for 42*l*. Terra-cotta as a medium for grand and minute ornamental works is not yet sufficiently understood.

STRIKE,—BUT HEAR!

THE large suburban population whose daily occupation depends on the more or less punctual service of the Brighton Railway have cause to rejoice that the state of open warfare between the directors and the engine-drivers of that line was not allowed to extend beyond forty-eight hours. We should gladly join in the congratulations that are pouring in on all sides but for the single consideration,—why should such a state of things have been allowed for even a single day? What new light upon the justice of the demands, or the propriety of their concession, has been derived from a dislocation of all arrangements depending on the locomotive service of this line for so short a period? Did the directors disbelieve that the men were in earnest, without this definite and costly proof? Did the men find one black Monday enough to send them back, as repentant prodigals, to their engine-sheds and their coke-ovens? Or was there, on either side, a point of honour involved, as in the Italian campaign? Did either party think it necessary to look the other in the face on a stricken field before consenting to treat? These questions are more likely to be multiplied than to be answered; but that a strike terminated in a day should never have been allowed to occur, — that the ultimate settlement would have been all the more satisfactory if it had not taken the form of an *ultimatissimum*, there can, we think, be no room to doubt.

We were silent on the subject of the dispute between managers and drivers while it was in progress for more than one reason. The rapid course of events, the doubtful state of probable results from day to day, were less suited to be treated of in the pages of a weekly journal than in those which never allow a topic to come cold before the public. And then the interests concerned were so grave, the disputants on either side had so much to say for themselves, that it seemed hardly permissible to treat the subject without devoting to it as much preliminary care and study as if we had been dealing with it in the character of an umpire.

Now, however, that all matters of dispute seem for the time, at least on this line, happily adjusted, it may be useful to call attention to some of those more important features of the case that are left to be lost sight of in the hurry of fight, or in the rejoicing attending reconciliation. A heavy price has been paid by the metropolis for the experience gained that Monday. What use is to be made of that experience? What are we to have for the price? The general, and, we think, the correct opinion on the case, before the stoppage, was, that most of the demands of the men were reasonable. On the other hand, the idea of not yielding to menace is native to the English character, and long may it remain so. And the position taken by the men as to equality of pay, at the same time that they hinted that an inequality might be maintained by raising the maximum, was at once indefinite and threatening. "Settle your disputes between yourselves," was the verdict of the public; "the real amount of divergence is not so great as to render friendly arrangement impossible; but do not make us pay the penalty of your misunderstanding. Do not let us witness the resort, by a skilled and educated body of men, to that weapon which reduces all who make use of it to the level of the idlest and least skilful of their body. Do not lose public sympathy by causing public inconvenience."

Now we are not ashamed to own to a very strong sympathy with the men. It is unnecessary to say that we do not sympathise with a strike. It is urged—what else can we do? We think much else can be done, and that with, instead of against, public sympathy. A strike is a very terrible weapon. It is a two-edged instrument, cuts both ways, and infallibly injures those by whom, as much or more than those against whom, it is employed. It gives a blow that is difficult to parry, and that is certain to injure by recoil. When once resorted to it leaves a sense of soreness in the defeated party, and a feeling of might being more than right in the victorious party, that are likely to prove prolific sources of future disputes. But above all other evils of this kind of warfare, we rank the injury inflicted on the men of most skill and eminence in their calling, who voluntarily reduce themselves to the ranks, and throw into the common fund of aggression all that naturally would place them at the head of their fellow-craftsmen. A successful organisation, resting on the power and the threat to strike, invokes the permanent degradation of the best workmen to the level of the worst.

In the case of the men to whose care is committed the active conduct of the traffic of the country, there are peculiar features. They are men who must possess for the proper discharge of their duties qualities of no mean order. Vigilance, sobriety, and presence of mind; strength of hand and clearness of vision; acquaintance to some extent with machinery, at least as far as the details of the locomotive are concerned; and sufficient strength of memory and perspicuity of thought to read complicated signals at a glance and at full speed,—all this must be had, and is had,—we must say cheap,—at the rate of 40*s*. to 45*s*. per week. Then the actual physical exposure is at times very severe. Ten hours' work in blinding sleet, or in parching sun, with no shelter for the head, with a fierce fire within a few inches, with no possibility of withdrawing the attention for even a short rest without danger; service of this kind by night as well as by day; the eye, the most delicate part of the organization, constantly on the stretch, and liable to constant irritation from the dust of the coke,—all this is no sinecure. Gentlemen who are fond of driving, and who think the post of engine-driver rather jolly, should spend a week's worktime on the foot-board; and they would find the salary that came in on Saturday night very fairly and very hardly earned.

Now, if we go to a body of men of this description,—men who do public service by day and by night, with their lives in their hand (for in any case of accident the engine-driver is the most likely victim),—with the argument that would hold good against a more numerous body of workmen, naturally including those of every degree of industry and of skill, we are met with a ready answer. There are, or there ought to be, no inefficient drivers. Every man to whom so responsible a post is intrusted must be fit for that post, or the consequence is far more than the debated 6d. or 1*s*. per diem. Here, then, we think the men have the best of the argument—the best, but not altogether the correct view of the case. Every man intrusted with the control of a locomotive ought to be a man of capacity and of character, deserving a very good rate of

wages. We are not attempting to fix that rate: call it five shillings or call it seven, it is the same for our argument. Let us say that any engine-driver has a right to expect a high minimum pay; and that no employer, who values his own character, would seek to engage a driver on lower terms.

But there are differences in the demands made upon the drivers. Much is demanded of every one; more is demanded of some. All qualities of alertness and endurance are more put to the test in the conduct of very swift trains than of slower and more ordinary traffic. All such qualities are more called for by night service than by daily duty. Both additional demands are made on the drivers of the night mails. That certain services, then, should be more highly remunerated than others, and that those services should be performed by the men whose claims were not alone those of seniority, but of seniority combined with greater aptitude for the task, is to the interest alike of managers and drivers; and by keeping in mind this view of the case, the question of permanent rate of wages can be justly and satisfactorily decided.

Then, again, as to the firemen. It is alike to the interest of the drivers and of the managers that the firemen should be apprentice engine-drivers. No one, in a perfectly-organized railway system, should be admitted to the tender, except in preparation for the future management of the engine. In any case of accident to the driver, the stoker has to supply his place. This necessary education should be systematised. Young men employed as firemen should be educated to some extent at the lathe and at the bench. The privilege might be given to engine-drivers of a certain seniority to take apprentices. And so soon as it became understood that such was the natural future of the stoker, the question of minimum pay would cease to be that of the utmost importance in his eyes. He would be content with a moderate present that ensured a definite future.

By placing matters on this footing, that degree of satisfaction and content would be established among the men that arises from a sense of being justly dealt with. The case should be that not of order, but of office. No officer expects an extra majority to be attached to his regiment because he has distinguished himself. Good service is the best claim to promotion, when vacancies occur, but not to the creation of brevet posts. Night-mail drivers, express drivers, and drivers of whom any unusual amount of vigilance or of endurance is expected should have adequately higher pay, as the pay of these superior posts, and that graduated scale of remuneration which is the life of all good service would thus be established on intelligible principles, and with justice to all parties.

There remains another consideration, and one as to which it is marvellous to reflect that it has been lost sight of by the numerous daily commentators on this memorable strike. Those men succeed best in their conduct of affairs who enlist human nature on their side. Managers are too apt to forget this. Discipline must be maintained, they say. The word of command must be given sharply. That is true under arms. But in dealing with Englishmen in civil capacities a soft word goes a long way. Kindness and consideration on the part of a manager will go further than many extra shillings tossed at the pay-table like bones to hungry dogs. But we mean something far more positive than this. The rate of the locomotive expenditure of a company is to a great extent in the hands of the drivers and firemen. The difference between a fair ordinary rate and a carefully economical rate of locomotive cost is one that would be distinctly felt in the half-yearly accounts.

From a fairly-paid and justly-contented staff the companies have a right to expect, and no doubt will receive, the fair attention to duty that will avoid extravagant cost. To do more than this they must interest their staff in effecting economy. Cases are of daily, and even of hourly occurrence, when the engine-driver has to choose between ease and economy. He may save the fuel and stores of the company, but he does it at the cost of his own fatigue. In all such cases the ordinary action of mankind is to save their own labour at the cost of their employers. It is a part of the privilege of employment, and is so regarded, more or less, in all services. The patient, untiring, self-sacrificing vigilance, that makes so much difference in the rate of constant expenditure, is not to be had without some direct inducement. So much, more or less, you may have from conscientiousness. Much more than this, however, is to be obtained, but there must be some direct stimulus applied to obtain it. Now, this constant and wholesome stimulus to the maximum amount of care and of economy is only to be certainly obtained by giving the workman an interest in the results.

The problem which it should be the unconscious effort of his whole day to solve should not be how to get the most out of his employers, but how to earn the most for his employers, while participating to some extent in the gain. We do not seek to enter into the details of the mode by which the account is to be regulated. The principle once adopted, the details will readily follow. A certain rate or proportion of expenditure must be regarded as normal. By all reduction on that expenditure the servants of the Company through whose exertions it is effected ought to benefit in participation with their employers. If this principle be clearly laid down and fairly acted upon, and if the locomotive staff be placed on the same footing with respect to seniority and promotion that a military locomotive superintendent, were such an officer in existence, would naturally arrange, not only will the public have no need to fear any further engine-drivers' strikes, but it will have received an equivalent for the loss, the inconvenience, and the alarm of the 25th of March, 1867.

VITAL STATISTICS: LONDON AND PARIS.

THE extension of the limits of the city of Paris to the fortifications on the 1st of January, 1860, has somewhat interfered with the comparison of the vital statistics of recent years with those recorded before the alterations in the boundary. The following results, however, which have been deduced from the "Statistique Générale de la France," from the monthly bulletins of M. Haussmann, prefect of the department of the Seine, and from other authentic sources, may be relied on. The Bulletin des Lois, which records the results of the recent census of France, states that the population of the city of Paris in 1866 was 1,825,274. In 1861 it was 1,696,141; the increase in the five years being at the rate of 1·48 per cent. per annum. The estimated population of London in 1866 was 3,037,991. The increase of population in the ten years, 1851-61, was at the rate of 1·73 per cent. per annum. The population of Paris is distributed over 19,280 English statute acres (7,802 hectares), the density of population in 1866 being ninety-five persons to an acre. The population of London, extending over an area of 77,997 acres, gave thirty-nine persons to an acre in 1866. The proximity of the population, upon the hypothesis of equal distribution, was 7·7 yards in Paris; while the inhabitants of the English metropolis were 12·0 yards asunder. As the results of sanitary reform only become apparent after an improved system of hygiene has been in operation for some time, the full effects of the alterations in the water supply, sewerage, street-ventilation, and house reform, commenced some years ago in Paris, have only been recorded of late years in a marked decrease in the rate of mortality.

In the two years 1857-8, the average annual rate of mortality to every 1,000 persons living was 27·3; in the three years 1859-61, it was 26·5; and in the three years 1862-64, it was 25·0. The annual rate of mortality per 1,000 of population in each of the two capitals, Paris and London, was 25·3, and 22·5 in 1860; 25·7 and 23·2 in 1861; 24·6 and 23·6 in 1862; 24·7 and 24·5 in 1863; 25·3 and 26·5 in 1864; 28·5 and 24·6 in 1865; and 27·0 and 26·5 in 1866. The cholera epidemics interfere with the comparison between the two capitals, in the years 1865-6, but looking at the results as a whole, it may be said that more people die in Paris than in London, in proportion to their respective populations. As far as the hygienic conditions of the two capitals are concerned, the inhabitants of London have the advantage of their Parisian neighbours. Much has been done of late years to improve the sanitary condition of the French capital, but it still labours under the great disadvantage of retaining in cesspools, for a certain time, the refuse which should be allowed to pass away by a system of sewerage; the underground drainage, which has been carried out on such a grand scale, being almost exclusively confined in its application to surface drainage. With regard to the improved system of water supply in the city of Paris, it may be stated that, as the service is seldom carried higher than the first floor, the occupiers of the upper stories of the houses are but imperfectly provided with water. The poorer classes draw largely from the filtered waters of the Seine, from which also the *porteurs d'eau* derive their supplies; but the quality is objectionable, as the water is exposed to much contamination. In 1860 Paris received only 32,503,028 gallons of water per day, and a considerable deduction was made from this quantity for municipal purposes. This summer the quantity will be increased to 47,000,000 gallons per day, and when the works in progress are completed, Mr. Burnell states that the supply will be increased to 105,000,000 gallons per day. London is now supplied with 100,000,000 gallons per day. Not only to deficiencies in the drainage, and in the water supply, may the slight excess in the mortality of Paris over that of London be attributed, but also to the dense overcrowding of the population that obtains in some parts of the French capital. The area of London—with a population not amounting to twice that of Paris—is four times as large as that of the French capital. The improved hygienic condition of the latter city in recent years, as compared with that of former periods, is, doubtless, partly owing to the removal of buildings that were injurious to health; but, nevertheless, some parts of the capital are too densely populated. The number of births per 1,000 of population in each of the capitals, Paris and London, was 30·37 and 34·80 in 1864, and 30·63 and 35·51 in 1865. The proportional number of illegitimate births in 1864 to every 1,000 children born was 288 in Paris, and 44 in London. The marriage-rate in 1864 (persons married to 1,000 of population) was 18·4 in Paris, and 21·4 in London.

NEW STYLE.

WHY is all this hankering after a new style? this dissatisfaction with a resuscitated architecture? this condemnation of new forms clothed with ancient graces? In fact, what is it that these learned writers want? They advise the study of old art, and at the same time condemn the use of it as a precedent. Truly this is not sound criticism, or language fails to express what it is they desire, and we need from them something more than words, some explanation with the pencil of the point of their meaning; yet I deem it difficult for them to give this. Do they really intend to affirm that the great revival that is in progress is all wrong? that the looking at old things has warped the imagination, and caused the wreck of common sense? Nay, rather is it not that those who disregard the great things of our forefathers, and either work upon their own resources, or passionately introduce novelty as the panacea of art are the men who produce nothing noteworthy or something that may be designated as architecture gone mad? I can have no sympathy with these restless incoherent ideas, for they seem to me to belong to a phase of criticism that is deficient in the encouragement of excellence and abundant in detraction. Where would have been the Roman style if it had not grown out of the Grecian that preceded it? Where would have been the Mediæval Gothic if it had not gradually arisen out of the weary periods of Romanesque? Where would have been the Italian Renaissance without a maternal precedent? and where, I will say, will be the English,—ay, the European development,—if the present active and varied exertion, founded on a knowledge of former deeds, were to be nipped in its spring by an unwise hypercriticism? We have in many new buildings a great attainment of excellence, as exhibited by their vigour, their originality of treatment, their beauty of form and detail, their suitability to their purpose; and, though it is true that none of them show a style that is wholly and solely Modern English, or Modern European, I fail to perceive that such a marked character is as yet either needful, or desirable, or possible. Let me, by negative and affirmative, look at our requirements. We do not want actual copies of any thing that has existed before, either in the mass or in particular parts. We do not want ill-contrived arrangements, nor anything that is unsuited to its use. We do not want extravagance or parsimony. We do not want a rejection of anything that science or knowledge may contribute towards the formation of a good building; but we do want walls, windows, doors, roofs formed with decorative fea-

tures, and having proportion, symmetry, variety, harmony, grace, colour, expression; and the attainment of these is practicable, and has been effected in a considerable degree in many modern structures that have no direct resemblance to former works, beyond the fact that they are the offspring of master-minds imbued with the principles and feelings that actuated other master-minds that have preceded them. It will not do to reply that these works have round arches, or pointed arches, or any other peculiar feature of a kind used before, and therefore that they have no originality, no new style, none of the excellence that should distinguish the architecture of the nineteenth century, an era which, in the eyes of some, appears to be one of wisdom, of enlightenment, and of purity, beyond all former precedent. Surely the assertion that architecture is in a retrograde state is a cruel libel: I thought it to be in quite the reverse of this; and who that can remember its condition thirty or forty years ago, when it was emerging out of timid puerility and sameness, does not think so too? But I ask again, what do the writers want? If they expect that a new style is to start up fully grown and equipped, like Minerva from Jupiter's brain, they are surely the persons who disregard common sense, and architects are the men who make use of common sense to develope the art of design out of former experiences. It has always been thus since the creation of the family of man. No art was ever developed at once; all has grown out of something that went before, and all has partaken of some of the feeling whence the new work has been derived; and no attempt has ever been made to cast aside precedent. But again I say, let them show us what they want, and then we will tell them whether their new style has common sense combined with beauty or not. It must be easy to do this if there be 5,000 new styles in prospect, but I altogether demur to this enumeration. E. N.

INQUISITION AS TO THE CAUSE OF FIRES.

A COMMITTEE of the House of Commons has been sitting for some time under the designation of a Fire Protection Committee, and has already placed upon the record a large mass of valuable evidence, upon all branches of the subject of fire insurance, fires, and their causes. Last week Mr. Smith, secretary of the Scottish Union Insurance Office, was examined at great length: his prolonged experience in connexion with fire insurance enabled him to give evidence on numerous points connected with the subject. The witness considered that the insurance-tax, imposed about 1702, was originally, and had always been, a war tax, which he considered it impolitic and unjust to continue in time of peace. He had computed the value of the property insured against fire at about 1,500 millions of pounds sterling about 1855, but the property insured now was much greater in value. Fires had increased in a much higher ratio than the increase in insurance business. He attributed many of these fires to incendiarism, and believed that at one time there had been, if there were not at present indeed, organised gangs of incendiaries in different parts of the country, and that the number of fires the origin of which could not be satisfactorily accounted for had been progressively on the increase for many years past. The insurance business was in consequence decidedly bad; some offices paying dividends to proprietors, but many others paying no dividends at all. Greater caution was being exercised by almost all offices in the acceptance of risks (his office refused many), and the number of fires, and value of the property destroyed by them, had been considerably diminished by attention to the construction of buildings and the storage and classification of goods insured. Some great fires he believed might be attributed to warehouse-thieves, who resorted to this means of concealing their depredations. Many others were doubtless attributable to culpable carelessness. The remedies he suggested for these evils were, that authority should be given for judicial investigation into the causes of fires, and he considered that the coroners of England and the procurators fiscal of Scotland would be competent officers to conduct such investigations.

He also recommended that the insurance offices should have a common defence fund, as bankers had, for their protection against unfair claims, as at present the offices never prosecuted for arson, and would rather let a criminal escape than risk the reputation of being litigious, or the character of being disposed to resist the payment of claims. He quoted figures relating to Baltimore, U.S., showing that the appointment of a fire-marshal had reduced the number of fires in that city to a small fraction of what it was before criminal investigation into the causes of fires was authorised. He had no doubt that, if the Salvage-corps of London, a comparatively modern institution, which was composed of the most intelligent men selected from the Fire Brigade, were authorised to investigate, or to initiate the investigation, into the causes of fires, they would speedily greatly diminish the number of conflagrations, especially of those accounted for by the term "spontaneous combustion,"—a phrase rarely, if ever, heard of forty years ago;—pointing to an important fact nevertheless, saywe.

GROSMONT CASTLE.

GROSMONT is one of five strong places disposed along the right or south-west bank of the Munnow river, the others being, below it, Skenfrith, and above it Oldcastle, Longtown, and the fortified house of Perthi. Monmouth Castle, and the town beneath its protection, occupied the junction of the Munnow with the Wye. These are some of the fortified buildings scattered broadcast over the Welsh marshes, and especially abundant in the county of Monmouth, and the remains of which, always picturesque, are often tolerably perfect.

In the rear of these castles on the Munnow were those of Brecknock, Tretower, Crickhowell, and Abergavenny, upon the Upper Usk, and over the whole of that country there is scarce a hill-top or point of vantage which is not occupied by some defensive earthwork, showing the importance attached to it by each of the several races, Celt, Roman, Saxon, and Norman, who in turn either attacked or defended this devoted soil.

Grosmont, about four miles above Skenfrith and five below Oldcastle, is placed, like the former fortress, upon the high concavity of a sharp bend of the river, about a hundred yards from its margin. Very near to it is the fine old cross church, which, having shared in the prosperity of the castle, has escaped its decay, and still remains in tolerable repair, although requiring a few subtractions and restorations at the hand of a judicious architect.

The castle is composed of a court or ward of irregular plan, more or less rectangular, with projections upon the south side, the wall of which contains a space of 110 ft. by 70 ft., strengthened on the south by a larger and a smaller three-quarter mural tower, having a gateway upon the east face, and on the west traces of a building exterior to the curtain wall. The north side is occupied by a hall, also exterior to, or rather replacing the line of, the curtain, three of its four walls forming a part of the exterior defences of the building.

The whole is placed within a ditch of great depth, and, indeed, the earthworks generally are of so laborious a character as to make it probable that they are earlier than the present building, or than any other work in masonry. The actual platform occupied by the walls and contained within the crest of the ditch, is about 150 ft. in diameter.

Outside the ditch, to the east and south, and covering the entrance of the castle, is a large demi-lune, or platform of earth, scarped towards the field, and upon which are traces of walls and a defence of the nature of a barbican. The main ditch, now traversed by a modern embankment, was evidently at one time crossed by the usual bridge, of which a part lifted. The gate-house, if such it can be called, presents two lateral cheeks of wall, projecting on either side of the bridge, and thus forming a covered way, from each side of which a cruciform loop is directed along the ditch. The pointed vault of the entrance is broken, but there remain the ragged grooves for the portcullis, and the two holes which received the large wooden bar confining the gate.

Entering, on the right, is the shell of the hall, 80 ft. long, by 27 ft. broad, out of all proportion to the area of the defences. The floor, of timber, was laid 6 ft. above the level of the court, so as to give height to a spacious basement store-room or cellar, but which, however, has a large fire-place in its east wall. The hall has windows at each end, and four in each side, but probably only the six to the east belonged to the hall, the other two lighting a withdrawing-room. The position of the fireplace on the north side seems to mark the centre of the hall.

On the left of the entrance the curtain extends to the south-east or smaller drum tower, and probably supported a spacious lean-to roof marked by the corbels or bearers for the upper wall-plate. This south-east tower seems to have been massive, but low, and to have been altered and enlarged at the gorge, on the side towards the court, which now projects inwards in a rectangular form. When this addition was made the tower seems to have been raised to three or perhaps four stories, and near its summit is a bold cordon.

A strong curtain extends from this to the south-west drum tower, of larger dimensions, and broken down towards the court. The floors of these two towers were of timber. Between them, and parallel to the curtain, seem to have been some buildings, probably barracks.

The buildings outside of and built against the west curtain projected boldly into the moat. They are in great decay. Here was the fireplace, the flue from which, wrought out in the substance of the curtain, rises above it as an elegant octagonal chimney shaft, the summit of which is crowned by the elegant lanthorn or spiracle which has so often been drawn, and is so well known.

Grosmont, as it now appears, is of moderate size and much mutilated; but its towers and walls, though stripped of their ashlar, are still standing, and the earthworks are large, bold, and well defined.

Whatever may be its primeval history, the present building presents nothing earlier than the reign of Henry III. The additions seem to have been in the Earlier Decorated style, and, probably, are of one date, that of the reign of Edward I. After the S. Welsh conquest, Grosmont was one of the numerous De Braose castles, and passed by inheritance to the Cantelupes. It then fell into the possession of Henry III., who granted it to Hubert de Burgh. In the well-known war waged by the Welsh and Richard Mareschal, Earl of Pembroke, against Henry III., it was besieged by Llewelyn and relieved by the king, who occupied it as head-quarters during the latter part of the campaign. After De Burgh's fall, Henry re-granted the castle to the Earl of Lancaster, and it has since, with the somewhat earlier castles of Skenfrith and Whitecastle, remained attached to the duchy. Henry, Crouchback's grandson, was here born, and hence styled Henry of Grismont. Probably he was the author of the principal additions.

The adjacent church contains a late Norman font, with cylindrical base and octagonal bowl; and the pier arches of the central tower are also Pointed Norman. Most of the remainder of the church is Early English, and probably of the date of the castle; but there is a Decorated north porch, and some other parts in the same style, which may have been the work of the artist who completed the additions to the castle, and its elegant chimney shaft and finial. C.

LOCAL BOARDS.

THE evils sustained by the public at large from the utter insufficiency of local Boards and other corporate bodies to meet their desired ends, cannot be too strongly agitated. To do this effectually, the means afforded by the powerful influence of a scientific public journal like the *Builder* are of inestimable value; and there can be little doubt that the letter of Mr. Rees, published in your issue of March 30, will have been read with interest by the majority of your readers. And it is to be trusted that the insertion of Mr. Rees's statement, taken in conjunction with the deliberately uttered and weighty judgment of many eminent authorities, like Mr. Hawkesley, pronounced upon the corporation control of engineering matters, will lead the public to a proper consideration of its interests. One urgent need is a thoroughly-searching investigation by select commission into the history of the manifold important enterprises affecting public health and convenience, whose sole control is vested in the hands of the divers public bodies composing the municipal government of this country. Let such an end be resolutely and persistently pursued; and, once attained, it cannot be doubted that then, and not till then, may we expect to see so gross a combination of official ignorance and jobbery deprived of the

absolute sway which forms its present privilege.

Having in common with numberless others of my profession suffered from the injustice of lying estimates in engineering schemes, winked at or overlooked by local Boards, I suggest, in the name of the public good, which, in nine cases out of ten, is sacrificed to the interests or prejudices of the authorised Boards, it be requested, by some considerable member of the House of Commons, that a return be made from every town and district in England of the actual cost of their respective works for water supply and main drainage, *together with their original estimates* and present efficiency for their destined purposes, and that means be taken to ensure the rigid accuracy of such return.

I have not an unbounded faith in the practical business genius of the Briton in aught relating to that Old Man of the Sea who haunts him in the shape of the mayor and corporation of his borough, extracting heavy toll with a remorseless hand which stretches forth to take, but which never yields back. But I believe—nay, I am sure—that the rays of light so directed would disclose so infinite an aggregation of shameless imposition upon a long-suffering public, that a continuance of the like would be impossible in the future. Without some such remedial step as this, we cannot in reason hope to avoid reaching the condition of corporate management recently exposed in New York, if, indeed, in some of our towns we do not already rival it.

At this present moment the town council of this borough (Leeds) are on the eve of committing the ratepayers to the final adoption of a gigantic addition to their existing system of waterworks. The brief history of this scheme is as follows:—Mr. Filliter, the borough engineer, constructed during last year a certain scheme for the supply of water. Of the details of this scheme I will say nothing, save that, having been professionally engaged over every foot of his gathering-ground, I know of none more certain to supply water impregnated with peaty essence. The scheme was laid before the Board, and it being, as usual in this borough, a Whig and Tory question, the former party procured its adoption. The estimated cost was 150,000*l.*; upon the strength of which powers from Parliament were applied for. The ratepayers were assured that this estimate was in excess, and that the consulting engineer would certainly reduce it. That gentleman (Mr. Hawkesley), however, having no desire to compromise his public reputation for the sake of private interests, has estimated the same work at 420,000*l.*; and to this must be added 30,000*l.*, since it appears that certain lands valued at 15,000*l.* or 16,000*l.* are to be paid for to the tune of 46,000*l.*, part of this latter sum being, I suppose, in settlement of opposition; so that, in spite of its deficiencies, the preamble of the Bill has been proved.

Possibly we may term this a more gross and flagrant instance of public credulity than usual. In appearance, granted that it is so; in reality it will be found no uncommon example of local misgovernment. It may be asked, what motive can a reputable body of men have in so pillorying their incompetency, or worse?

In reply, I would ask, what motive *can* a man, unscrupulous and powerful, with private interests to serve, with no official responsibility, with strong personal resentments, and with inflamed party bias, have in serving those interests, in using that irresponsibility, in gratifying those resentments, and in furthering the views of his party? I do not hesitate to state a well-known fact, that all these disturbing ingredients are component parts in the constitution of our various bodies corporate, who, like Judas, "carry the bag."

Without any inclination to trespass unduly upon your space, I will, under suffrance, give another instance where it would appear that public scrutiny is needed. The commissioners of Leytonstone, in Essex, have recently invited competition for the drainage of their district, stating that information would be supplied by Messrs. Houghton & Wragg, 15A, St. Helen's-place, London. On applying to these gentlemen, by letter, I received no answer. I again wrote, and was told I had turned my attention to what was not worth my while, and that I could get information, by applying in person, at their offices. Once more I requested some particulars, and again I was informed I could get them on personal application.

What I wished was, of course, to ascertain whether it was worth while to take the matter in hand or not; but such knowledge I could not obtain. Since then a friend, also an engineer, has applied for particulars, and has received no reply. In this place I would ask these gentlemen if the appointment was made prior to the advertisement that it was deemed a waste of time for any one else to take the matter into consideration?

One illustration is weightier than many arguments, and the foregoing faithfully represent, in most instances, the value of those unpaid public servants who, without let or hinderance, exercise the functions of purse-bearer and purveyor-general to the public. Is there any specific reason why the supply of water to the public should not be regulated by private enterprise with unlimited competition? It is certain that no private company would be biassed by personal regard in favour of professional advisers, no matter what their virtues. Your engineer or contractor might be after your own heart in politics, might attend your own place of worship, or might be married to your own daughter; but, my good common-councilman, alderman, or mayor, your ear would be deaf to all these potent qualifications when opposed to professional capacity, *if you, and not the public, were to reap the profit and loss.*

M. P.

HILLINGDON CEMETERY CHAPELS, MIDDLESEX.

THESE new chapels have been recently completed; that for the Episcopal Church having been consecrated by the Bishop of Rupert's Town on March 13. The latter has a polygonal apse and a bell gable turret. The Dissenters' Chapel is situated near the Episcopal one. There is also a massive gate-house and entrance-archway to the cemetery. The general material of the walls is Kentish rag, with Bath Box-ground stone dressings. The roofs are covered with plain red tiles. The works have been carried out under the superintendence of Mr. Ferrey, F.S.A., at a cost of about 1,800*l.* The contractors were Messrs. Fassnidge & Son, of Uxbridge.

"THE CONTRACTOR AND THE WORKMAN."

A MILLIONAIRE mason, in a story told in the *People's Magazine*, explains how it is that he is better off than the mass of the companions of his working days. A discontented working mason is the narrator:—

A large case occupied the end of the room, divided into compartments, and each labelled, and on a bureau were heaped bills and estimates. The contractor stopped before the great table, and showing me a water-coloured plan, said:

"This plan requires modifying. They want to reduce the building three mètres, but without diminishing the number of rooms, and you must also find a place for the staircase. Sit down and make a rough sketch of the thing."

I looked at him surprised, and told him I could not draw.

"Then examine these measurements for me, and see if the estimates are correct."

I answered that I was not up in such work as estimating prices and verifying measurements.

"You can at least tell me," continued the contractor, "what necessary legal forms I must comply with, in regard to the three houses I am about to build?"

I brusquely answered, "I was no lawyer."

"And as you are also not a banker you are, without doubt, ignorant how to arrange your payments, and what interest you ought to receive on your capital to avoid bankruptcy. As you are not a merchant you would find it difficult to tell me where the best materials are to be procured, and the proper time for purchasing, and the most economical means of transport. As you are not a mechanician it is useless to inquire whether that crane, of which you see the model, is likely to save labour, and therefore expense. As you are not a mathematician you will in vain attempt to judge of this new system of bridge-building I am about to try on the Lower Seine. In short, you know nothing but what a hundred others among your companions know: you, like them, are only fit to handle the hammer and the trowel."

I was completely disconcerted, and I twisted my hat instead of replying: indeed, I had nothing to say.

"Do you understand now why I live in a fine house, while you inhabit a garret?" continued the contractor, elevating his voice. "It is because I exerted myself; it is because I have learnt all you have neglected to attain; it is in consequence of voluntary study I am become a general while you remain among the recruits. By what right do you demand the same advantages as your superiors? Ought not society to reward each according to the service he renders? If you desire that society should treat you as she has treated me, do as I have done: deny yourself even bread to buy books: spend the day in work, and the night in study. Be ever on the look-out for instruction, as a merchant looks out for profit; and when you have shown that nothing discourages you, when you shall have learned rightly to understand and value things and men, then, if you still remain the inhabitant of a garret, come and tell your tale, and I will listen to you."

ROCKHURST, WEST HOATHLEY, SUSSEX.

THERE are few places within thirty-five miles of London possessed of so many natural charms as is the estate now known as Rockhurst, on the East Grinstead line of railway, including, as it does, pasture, trees, rocks, and water; and here the owner of it, Mr. Charles Hill, F.S.A., has recently built a not large but compact residence, from the designs of Messrs. G. & H. Godwin, architects. We give a view of the house, showing particularly the entrance-front, and we add plans of the principal floors.

The walls are constructed of sandstone quarried on the estate, with brick inside, a space of 2 in. being left between the stone and brick. Galvanised-iron ties at short intervals keep the two together. Some bands of Mansfield stone are sparingly introduced, and there are a few ornamental coloured tiles in the window-heads of the garden front. The arches of the carriage-porch are ornamented with carved honeysuckle, and in the cornice is running ivy; executed, as was all the other carving, by Mr. Jaquet, of Stamford-street. The contractors were Messrs. Fuller & Longley, of Worth.

The plans show the accommodation afforded on the ground-floor and one-pair story. There are besides offices in a basement formed below part of the house (gained through the slope of the ground), and half a dozen good servants' rooms in the roof.

The dining-room has been fitted up with some old carved oak panelling, and has a panelled ceiling.

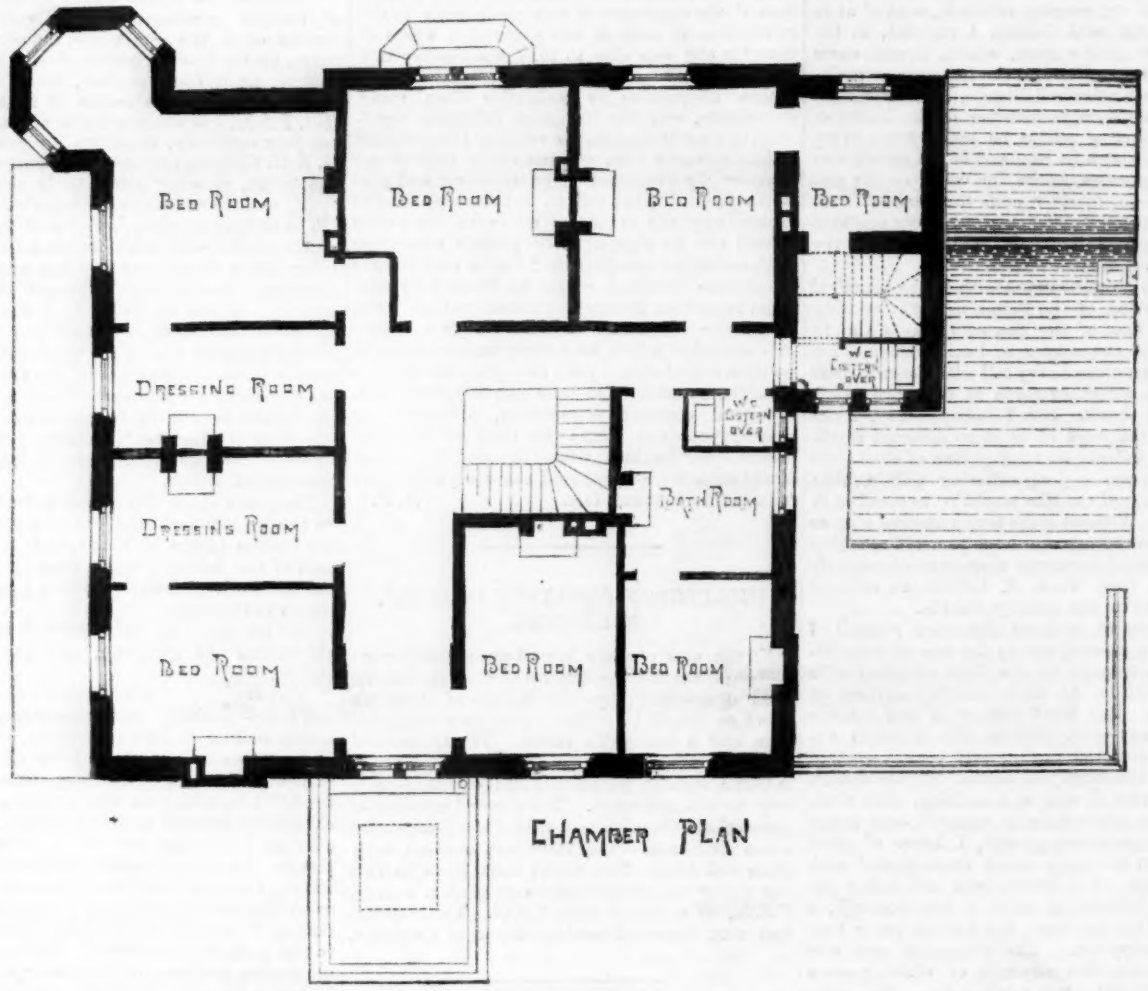
The capitals of the various columns at the entrance-doorway and elsewhere, and the bosses ending the string-courses, are enriched with stone carvings of the ferns found growing in the grounds, or in the immediate neighbourhood. Abounding as the situation does with chalybeate springs and sandy rocks, few places offer such a fitting habitat for these favourite plants. In a semi-natural, semi-artificial hardy fernery on one side of the house, and completely overshadowed with trees, is a large collection of British ferns and shade-loving plants growing in the greatest luxuriance. Amongst the most noticeable, perhaps, of the latter in this ferny hollow is the one complete green carpet at the bottom, of golden saxifrage (*Chrysosplenium oppositifolium*).

The well from which water is supplied to the house is about 80 ft. in depth. The stables are at a short distance from the residence, near the old house originally occupied by the owner of the estate.

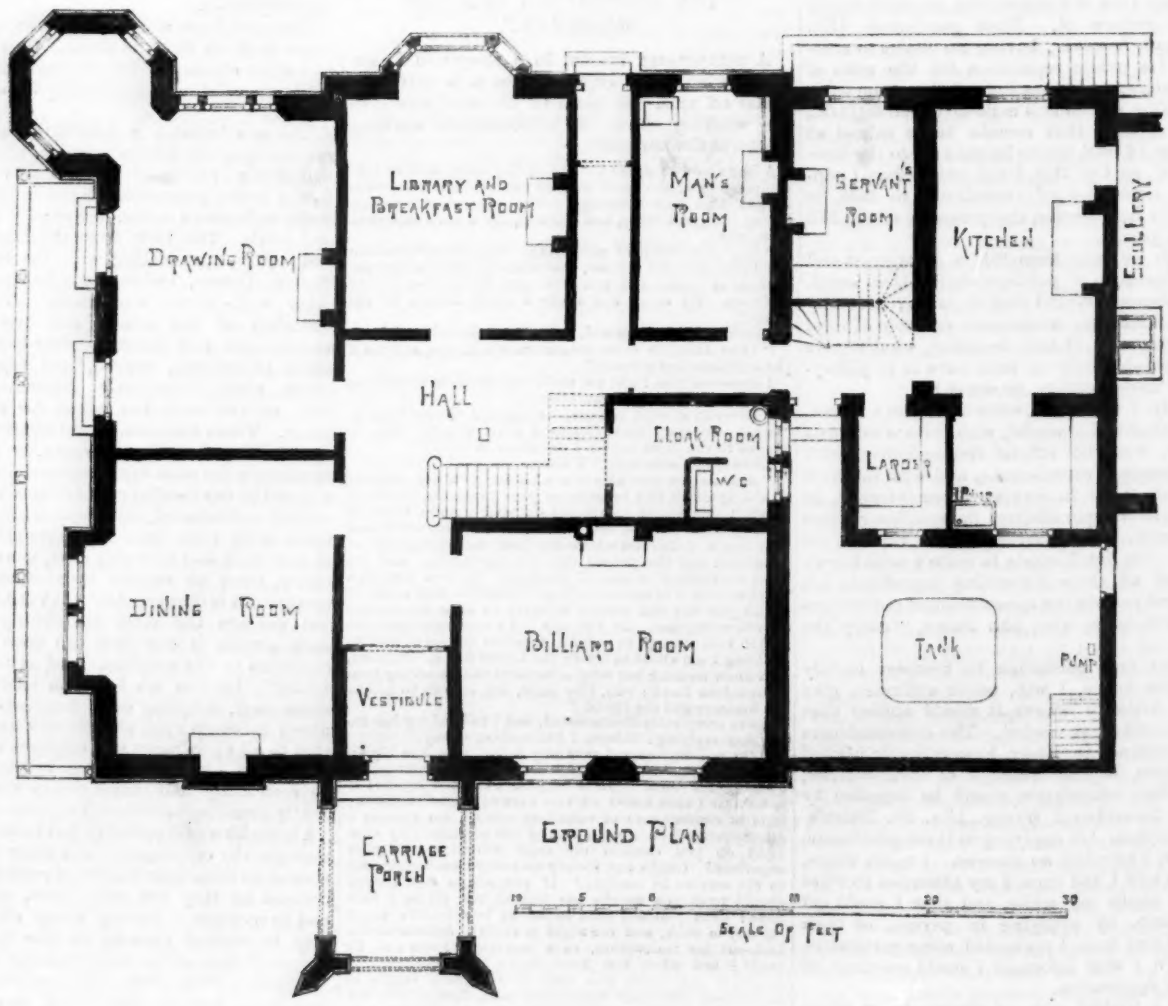
The new building is erected on an eminence commanding the fertile grounds, which form an undulating valley of pasture and woodland. In the dense plantations of the latter are many large well-grown trees, principally of oak, fir, and larch. The view from the house is varied and superb, terminating with the fine range of Sussex Downs, embracing Chanctonbury and other well-known eminences. Towards one boundary of the estate, and overlooking an ancient and now dried-up river-bed, is a long series of colossal, rugged, and toppling sandstone rocks, irregularly stretching, side by side, or one over the other, for a great distance. These huge stones are undermined, piled upon each other, thrown down, or balanced in apparently the most dangerous and fantastic manner, and by our forefathers have been variously inscribed and tattooed, many names and dates upon them being more than 200 years old. The side of one dark and frowning cave, more within the estate, bears an ancient inscription, telling the spectator it is the veritable "CAVE ADVLLAM;" but perhaps the most astonishing of all the rock groups is one that has been known for centuries in the neighbourhood as "Great upon Little." In this we have an enormous sandstone rock, weighing some hundreds of tons, so nicely balanced upon an infinitely smaller stone, that to all appearance the slightest touch would displace it. In the dry river-bed below, are to be seen many half-buried stones that have evidently been displaced from the parent rocks above.

A botanist would probably find no end of rarities amongst the cryptogamic and other plants that abound on these huge masses of porous sandstone, covered as they are with ferns, scale-mosses, and liver-worts. Among many other species, may be noticed growing on the wet shelving ledges of some of the subterraneous caverns, the Tunbridge Film Fern (*Hymenophyllum Tunbridgense*), and on the humid, dripping sandstone rocks are many luxuriant liver-worts.

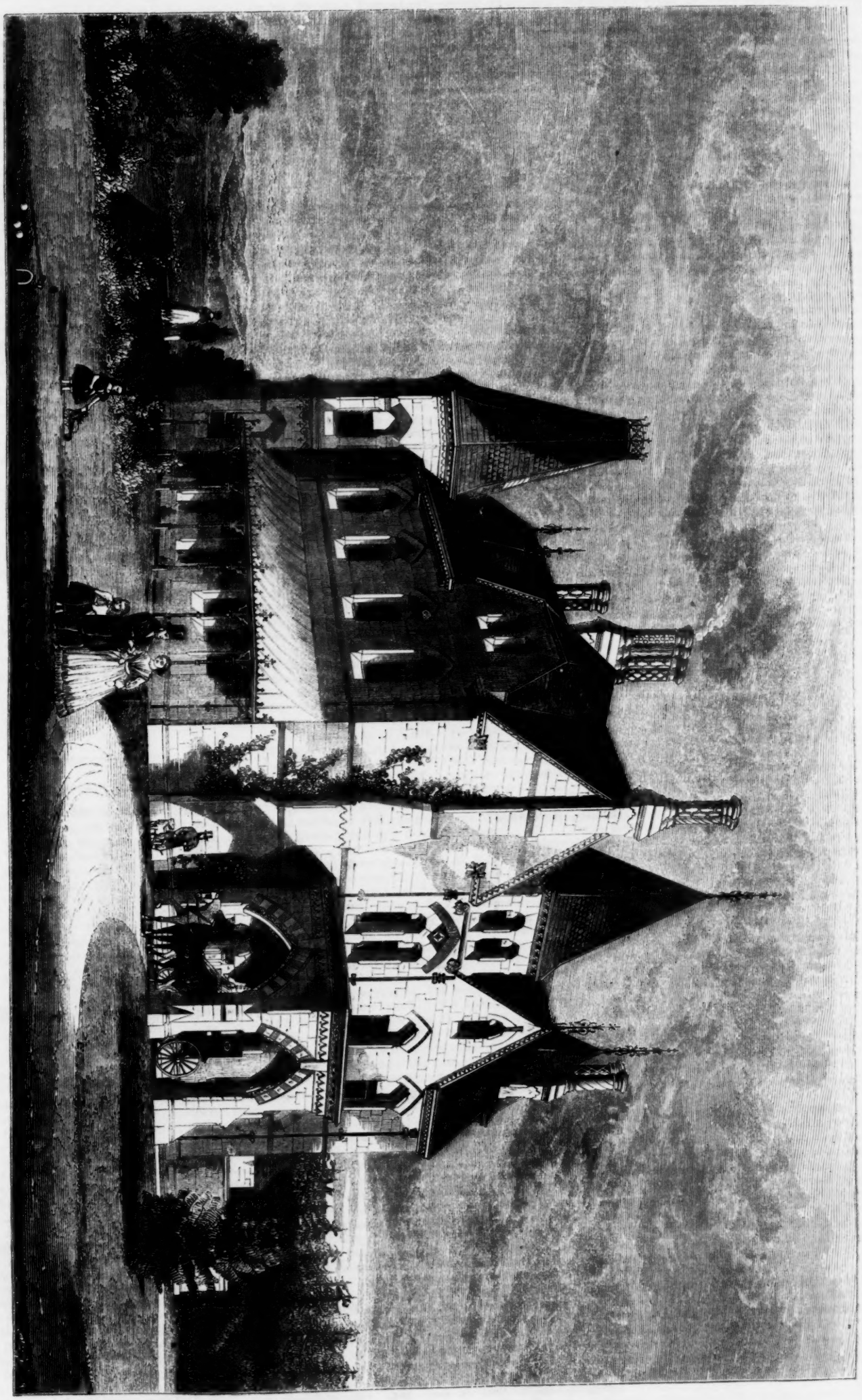
ROCKHURST, WEST HOATHLEY.



CHAMBER PLAN



GROUND PLAN



ROCKHURST, WEST HOATHLEY, SUSSEX.—MESSRS. GEO. & HENRY GODWIN, ARCHITECTS.

THE NEW ASSEMBLY ROOM, BRIGHTON.

THE stables of the Pavilion Palace have now been converted into an Assembly-room, and a trial of its acoustic properties has been made, the result, it is said, being satisfactory. The dome, and chandelier of 1,300 gas jets, are the chief features of the Assembly-room. The area under the dome is 80 ft. diameter in the clear of the columns supporting the gallery front, and the site of the former stables is 22 ft. on each side, thus making the extreme diameter 124 ft. The dome is composed of twenty-four bays. The whole of the old glass, and great part of the lead work, have been replaced with new; and the sixteen larger bays have been filled in with a boarded ceiling, in which are the stained-glass windows that light the room during the day. The windows are composed of circles, &c., variously grouped, and the design of the glass is also varied to suit each case. The panels have arabesques in chocolate on a buff ground: those of the eight narrow bays are filled with richer arabesques on blue ground; and the decoration of the dome is completed by the principal ribs being painted with alternate panels of a running pattern of suitable design. The gallery front, which retains more of its original form than any other part of the building, is decorated with a warm chocolate ground, and the cusped fillets of the arches are all gilt. The lower part of the dome, where the stables stood, have been greatly altered: the fronts, partitions, and fittings have been entirely removed, and the timber uprights cut away, and iron columns and brackets have been substituted for them; these columns are coloured in maroon, and the capitals and brackets are gilt. The orchestra is on the south side of the room, and occupies the width of three large bays of the dome. The front forms an arcade of three decorated arches of Moresque design, supported by slender iron columns. The detailed drawings and specifications were prepared by the surveyor, and in September last the tenders were accepted for the performance of the work, as under:—

For the builder's work, Messrs. G. Cheesman & Co., Brighton	£3,710
For the decorator's work, Mr. T. Dury, of Warwick	1,420
For the gas-fitter's work, Mr. H. Greene, Pavilion-buildings	426

PROVINCIAL NEWS.

Birmingham.—The unoccupied space at the corner of New-street and Stephenson-place is about to become the site of a public improvement, by the erection of a building for the Midland Bank, which has outgrown its present accommodation in Union-street. The piece of land obtained by the directors (on a ninety-nine years' lease from the governors of the Free Grammar School) has a frontage, according to our authority, the local *Journal*, of about 60 ft. to New-street, and of about 150 ft. to Stephenson-place. The whole of the space, however, will not be occupied by the bank buildings. Part of it, near the bottom of Stephenson-place, and having a frontage to the new street proposed to be made into Pinfold-street, will be reserved for the erection of offices; and by arrangement with the corporation, the angle of New-street and Stephenson-place will be rounded off, and the building line fronting New-street will be slightly set back. The bank will also be erected within a railing, designed to protect the basement story. The style is described as Classical, the front towards New-street being arranged in three, and that to Stephenson-place in eight compartments, divided on the ground floor by Ionic rusticated pilasters, resting on a plain basement; and on the first floor by attached Corinthian columns, with coupled pilasters at the angles. Each division will be pierced with a window of suitable design. Above these will be an enriched cornice, surmounted by an open balustrade, carried higher at the angles, and finished with coupled pilasters. The principal entrance will be in New-street, and will be distinguished by a portico, with four detached columns, of the Ionic order, the shafts and bases being of polished granite. The main fronts will be executed in Portland stone. The interior of the building will consist of a room (the "bank" proper) 92 ft. long, 49 ft. wide, and 30 ft. high, lighted by nine semi-circular headed windows, each 18 ft. high, and also by a dome or lantern, 37 ft. by 18 ft. On the same floor there will be private rooms for the managers; and on the first floor will be a board-room (fronting New-street), private rooms, and living and sleeping rooms for the resident clerks and porters. In the basement provision is made for dining and cloak rooms and lavatories, for the clerks; and also for store-rooms, especial attention being paid to "the bullion-room," which is to be defended by triple walls of great thickness, and a strong iron lining. The whole building will be warmed and ventilated on Van Hecke's plan.

FROM SCOTLAND.

Glasgow.—A new tidal basin which has been constructed on the south side of the Clyde, about half a mile below Glasgow Bridge, has been placed in communication with the harbour. The basin occupies an area of five acres and a third, and is surrounded with quays, on which sheds for the reception of merchandise are about to be erected. It is to be dredged to a depth of 22 ft. below high water of spring tides.

Dunfermline.—A report by Dr. Stevenson Macadam on the water of seven of the public wells in Dunfermline has been sent to the managing committee of the parochial board by the town-clerk, on the instruction of the Police Commission, as the local authority. Dr. Macadam reported that the specimens of water sent to him presented a good appearance, and were devoid of colour; but that the water differed materially in composition. Two of the samples contained organic matter, accompanied with nitrates, and which, along with other peculiarities, indicated contamination of the water with decomposing organic matter of animal origin, such as might be derived from house cesspools, surface street drainage, or imperfect sewers. After some conversation on the report, the meeting instructed their law-agent to take the necessary steps to close up Strachan's Well. It was agreed to procure samples of water of the private wells in the parish, for the purpose of having them analysed. The Lord Provost, who presided, submitted to the committee meeting a statement of the rate of mortality for the past month, which showed that in the royal burgh there had been five deaths out of a population of 8,401; in the Parliamentary burgh, nine from a population of 5,103; and in the landward district, seven out of a population of 7,448. In submitting the statement, the Lord Provost said it was for the interest of the ratepayers to look into the cause or causes why there was so great an increase in the rate of mortality in the suburbs, and it was resolved that the committee should inquire into the causes of this great increase of mortality in the district, and how it could be remedied.

Leith.—The Public Institute building, which is situated about the centre of Tolbooth Wynd, has now been completed, and inaugurated. The Institute is a brick building, with a doorway of stone. On the ground-floor is a reading-room, 48 ft. by 26 ft. Adjoining the reading-room is a committee-room, 15 ft. by 12 ft. From the lobby, a staircase leads to a gallery, which has been fitted up with shelving sufficient for 10,000 volumes. Of this number, nearly 8,000 have already been acquired. For works of reference, a room has been specially set apart, measuring 23 ft. by 14 ft., which is entered from the gallery. At the further end of the reading-room, a stair leads to bagatelle and smoking rooms, which occupy the back part of the building. The roof is open-timbered with large windows. The architect was Mr. James Simpson, the assessor for the burgh. The whole structure, together with its furnishings, has been reared at a cost of somewhat less than 1,300*l.*

The Wallace National Monument at Stirling. Since we drew attention, in October last, to this memorial, and inserted a subsequent letter from Mr. Burn, a member of the building committee, the workmen have been making such progress as was practicable in the winter season. The building committee have lately issued a report, in which they say:—"The great tower has now reached the height of 175 ft., including a portion of the open crown, and what remains to complete this, the chief portion of the design, consists in closing this crown, which, if necessary funds are supplied, may be done in the course of the approaching summer, when the tower will appear in all its contemplated amplitude and symmetry. It also appears, as the result of a very careful calculation by the architect and superintendent, that, even at such enhanced prices, a further sum of 1,200*l.* will suffice for this purpose; after which, all that is required to complete the original design is the erection of the warder's house, by which the base is broadened and rendered effective, the foundations having been already laid: this, according to the same careful estimate, will cost the sum of 1,400*l.* The total expense has turned out to be greatly in excess of the original estimates and contract. But the committee state, with confidence, that this has not arisen from anything under their control. At present they have on hand funds sufficient for about two months' operations."

New Lighthouse on Dhuhcartach Rock.—The Commissioners of Northern Lighthouses, according to the *Scotsman*, are about to commence a work of no ordinary difficulty,—the erection of a lighthouse tower, from the designs of their engineers, Messrs. D. & T. Stevenson, on Dhuhcartach Rock, lying fifteen miles to the south-west of Iona, and exposed to the full fury of the Atlantic Ocean. It will light up the gap between the Rhins of Islay and Skerryvore, and lead vessels clear of the Torrin Rocks and into the shelter afforded by Colonsay. The rock on which the tower is to be placed is a rounded mass, about 240 ft. in length, and 130 ft. in breadth, and is surrounded on all sides by deep water. The landings are likely to be attended with much inconvenience, while the distance from land (being about one-third greater than in the case of the Eddystone or the Skerryvore) will further tend to increase the difficulty. The tower, which is to be a parabolic shaft, rising to the height of 101 ft., is to be surmounted by a first order fixed dioptric apparatus. The dwellings for the light-keepers and crew of the tender are to be on Earraid Island, in the Sound of Iona; and the cost of the works is estimated at 56,900*l.*

Leith.—A young man employed at the new docks, while working a travelling-crane used for raising and lowering stones required for the erection of the quay wall, accidentally lost his footing and fell to the ground, whereby he has been seriously injured. Besides other injuries sustained, his right arm was fractured in two places, and the arm has been amputated.

STRIKES.

Cardiff.—The whole of the carpenters of this town have struck for an advance of wages. They want 30s. per week, being an advance of 3s. The masons have given notice that after the 1st of next month they intend leaving off work at one o'clock on Saturdays. The Cardiff Builders' Association have issued a broad sheet, in which they give the public an explanation of the circumstances. They state that "a demand was made in October last for a rise in the rate of wages of 6d. per day, to commence on the 1st of April, the wages at that time being 4s. 6d. per day. After interviews with the carpenters' deputation, in which attempts were made to settle the dispute, the Builders' Association felt obliged to refuse the demand. They, however, proposed to compromise the matter by offering 6d. per hour, and payment by the hour, which would have amounted to 28s. 9d. per week. The men refused to accept this offer, but made a counter proposition of 4d. per day rise, payment by the day, with a promise by the masters of 2d. further rise twelve months afterwards." Among the reasons stated for their refusal to give the advance demanded, the masters state that, "The Carpenters' Union have singled out the house-builders for attack, leaving the Taff Vale Company, the Rhymney Railway Company, and the Bute estate, unmolested, thus making a cat's-paw of them and their men;" and that "the building trade is at present in a depressed state, both in Cardiff and the surrounding district, and they think it their duty to prevent the men forcing the wages by combination above the market rate." The present rate paid by the town builders, they say, is 15 per cent. higher than that paid by the Taff Vale Company, and equal to that paid by the Bute estate; and it would be 25 per cent. higher in the one case and 10 per cent. higher in the other, if the advance were granted.

Barnsley.—The strike of joiners at Barnsley has, we learn, come to an end. At a meeting of the masters and men, after a short discussion, the masters agreed to grant the hour per day reduction in the working time, and to give 1s. per week more money than was paid prior to the strike.

Railway Employés.—The engine-drivers and stokers on the Darlington section of the North-Eastern line of railway have struck work for an

advance of wages, a reduction of the hours of labour, and a general redress of grievances formerly complained of. The directors say that the men have struck work without giving any formal notice beforehand; but the men explain that they only struck work after many vain endeavours had from time to time been made to avoid such a course; and that it was only after they found that the directors would do nothing to redress their grievances that they struck work. The drivers and stokers on other sections of the North-Eastern have also struck, and the directors have endeavoured to obtain a decision of the magistrates against the men for breach of contract; but the case selected was dismissed on the ground that the contract was one-sided. The traffic on some of the branch lines has been discontinued; but the directors, it is said, are obtaining new hands, and gradually restoring the traffic, both on the main line and on the branches. That the drivers and stokers *have* grievances which ought to be redressed, especially as regards overtime, seems evident. A metropolitan meeting of engine-drivers and firemen have resolved to support the men of the North-Eastern line.——The Great Northern engine-drivers and firemen having memorialized their directors for a reduction of the hours of labour and an increase of wages, have had their claims granted so as to leave no cause of complaint. In future, ten hours will constitute the day's work; and for all time worked beyond, the pay will be reckoned at eight hours per day. The drivers will have 5s. 6d. a day for the first year, 6s. for the second, and 7s. for the third; while the firemen will have 3s. 6d., 3s. 9d., and 4s. respectively. For Sunday work, time and a half will be given; and a nine hours' interval will be allowed after day's work, except on urgent occasions.——The strike which took place of the navvies employed on the extension of the Midland Railway at Somers Town, &c., for an increase of wages from 3s. 9d. to 4s. a day, is said to have had no connexion, as rumoured, with the introduction of Belgian navvies. The men, about 400 in number, were paid off by the contractors, who it is said will have no difficulty in supplying their places with others at the old rate of payment.

THE TRADES UNION COMMISSION.

THE evidence already taken has been very voluminous. Some of the more important witnesses have been the secretaries of the various societies. Among these was Mr. E. Coulson, secretary of the Operative Bricklayers' Society, of London. He said the society numbered 5,700 members, and had 96 branches. The increase of members was 700 last year, and the funds, up to December, were about 3,200*l.* in hand; the income for the previous year was about 2,700*l.* The objects of the society had reference to trade purposes, and burial and travelling relief to the members. The amount for men travelling about the country was very small, and the money expended for strikes during a year would not amount to more than 300*l.* or 400*l.*—at least, it had not gone beyond that since 1861. Where lodges had recently been established they had, in consequence of the organisation of the men, succeeded in obtaining a satisfactory advance of wages without any protracted strike. No member of the society in any district could enter on a strike without the consent of the whole of the members of the society—that was to say, of the majority of the members. The executive in many instances have prevented strikes taking place in districts, considering that it would be perfect madness on the part of the men to enter into those contests. . . . The cause of strike in recent years had been that the employers had endeavoured to force upon the men rules that were considered objectionable by them, with reference to the hours of working and the rate of wages. The men in each district determined what was the proper rate of wages, proceeding upon the principle of the prices of food, house-rent, &c. An equivalent in wages was decided by the general average of the number of bricks a man could lay in a day; if the work was inferior, he could lay more; if superior, less. Not the slightest objection was made by the men to hard bricks. . . . Mr. Roebuck: Do they object to bricks made by machinery?—No. . . . So that if persons have taken out a patent for making bricks by machinery, you have never known of the trade refusing to use those bricks?—Not in the London district. . . Therefore, it is totally untrue that a patentee has been ruined, because his bricks have not been accepted, and would not be received by any portion of the London trade?—Totally untrue in the London district. . . . Have you ever known it in any other?—I do not know it in any other. There was a high moral feeling against the practice of scamping work, and trades' unions had caused the work to be done in a manner superior to what it was before: decidedly a more honourable feeling had been promoted by trades' unions. There were no secret rules, and the bye-laws were in conformity with the general rules. In Edinburgh, Coatbridge, Burslem, Longton, Newcastle, and other places, there were rules which had been agreed to between the masters and the men, and these rules had been found to prevent the occurrence of disputes. . . . Mr. Harrison: It is said that the society has a rule forbidding a member to put down his trowel and lay bricks with both hands. Is there any such rule in existence?—There is no such rule in existence, and no such custom. . . . On being asked by Mr. Mathews,—Is there any restriction laid upon the clever workman as to the rapidity with which he shall work?—The witness replied in the negative. . . . You have no restriction then in your society such as they have in the Stonemasons' Society, against what is called "chasing," that is to say, a man working more rapidly than others?—No such rule at all. . . . There would be no objection to a clever man laying bricks by the thousand if he wished to do so, and thereby to increase his daily wage. The society had an objection to piece-work, believing it made men slovenly and careless, but there was no rule against it, and the men would not object to work with a man who was working by piece. If men struck for such a cause the society would not support them in the strike. There was no rule against working overtime, and no objection had ever been made to any number of apprentices when they were legally bound to the employer. The society objected to a labourer being taken from the hod and put to the trowel. The masons opposed any setting of stone by bricklayers, and witness's society felt that their own men were inexperienced in stonework, and therefore could only set the stone in a very careless way; but as to putting on stone coping or odd jobs of stonework, they could do it as well as the masons, and the latter would have no power over that. On railways witness had known compost cast put in side walls instead of bricks; the employers shut their eyes to it, and the clerk of the works was in fault. . . . The Chairman: They all try to get as much money as they can for as loose work as possible, you think?—Yes. . . . Sometimes the eyes of the clerk of the works were shut purposely. The society did nothing to encourage these practices. . . . Mr. Harrison: Does it do anything to oppose them where it can?—We should not meet with any encouragement from the employers if we did. . . . There was more reality and honesty in the old work than in the modern; in an old piece of work the mortar was hard and sound, but all kinds of rubbish were now used to make mortar, and in a few years it crumbled to pieces. This did not arise at all from a superior knowledge of making mortar formerly. Give the men time and material, and they could do anything. As a general rule, work was better done in the last century than now. . . . Mr. Roebuck: And that in spite of the existence of trades' unions now?—Yes, we are only too happy to do the work as well as possible, but we often have no encouragement to do it as well as it might be done. Bricks were superior now to what they used to be, but the mortar was worse, and the work was not so honestly done. A great deal of time was saved by making inferior mortar, besides the saving of material. Witness knew for a fact that in a certain house on which he once worked there were 20,000 bricks, when there ought to be 73,000. All the bottom part of the house was filled up with the old foundations of other houses that had been carted there; then, pockets, or places 14 in. by 9 in., or 14 in. square, which should have been filled in with brick, were carried up in the top part of the house to within four or five courses of the next floor. These "pockets" were left with the knowledge of the master. This job was not sub-contracted to the men, so that they got nothing by the pockets being left. . . . Mr. Roebuck: You say this occurred not in piecework, but in daywork?—Day-work. . . . Therefore this roguery took place under the very circumstances which you say are sought by you for the purpose of preventing roguery?—In that instance it was so, but you cannot compare a public work and the speculative buildings to which I have referred; those houses are simply erected to sell; it is not quality that they want there, but quantity. . . . By Mr. Harrison: The cause of this "scamping" was a desire to erect the building as quickly as possible, merely to sell, and nothing that the union had done affected it in any way whatever.

Mr. Richard Harnott, secretary of the Friendly Society of Operative Masons, said that the society had 278 branches. The income of the society from November 30, 1865, to November 29, 1866, was 17,746*l.* 4s. 11d½., and there was a general or reserve fund amounting at present to about 10,000*l.*, besides a little in the various lodges. There were branches in England and Wales, but none in Scotland. The society increased last year by 4,860 members. The objects of the trade society were to protect the members from all encroachments by employers, as well as to maintain the rate of wages generally. When a branch wished to give notice of a rise of wages, the consent of the society had to be obtained. If the society granted the application, then the employers received a notice of three or six months, allowing time to finish contracts on hand. The central committee never suggested to the men that they ought to apply for an advance, or take any part in beginning the demand. It was not the object of the society to equalize wages throughout England, or to compel employers to pay an inferior workman more than he was worth. There was no provision to prevent a member of the society, not being a competent man, from working for lower wages than the rate which was sanctioned for his district. If he was a competent man he was not free to work for lower wages. If he did so there was a rule to impose a penalty on him. The society did not recognise piece-work, and they fined a man for working by the piece where piece-work had been abolished. A reasonable number of apprentices was allowed, and there was no rule establishing a limit. It was left to each branch. There was a rule against overtime unless in case of emergency, which very often arose in the building trades. The witness considered that the effect of the society upon the men had been to improve them in character, social position, and energy; and there had been a great improvement in wages in the last few years—whether on account of the operation of the society or on account of the improvement of the building trades of the country generally he could not say. In some places employers had actually advanced wages of themselves in order to secure a sufficient number of men to perform their work. If a master took more apprentices than the men in the shop thought was right—and the number was regulated according to each shop, not according to each branch—then the men complained to the lodge, and the lodge to the society. Generally a delegate went from the lodge to the master, and if he refused to redress the grievance, the witness supposed there would be a disturbance or dispute, but there never had occurred throughout the whole trade any suspension of labour in consequence of the employ of an excess of apprentices.—Mr. Roebuck: What is the advantage which you expect from a reduced number of hours of work, rather than from increased wages? It is considered that it causes more men to be employed; there is work for an increased number of hands. Old and infirm members were allowed to take lower wages, at a rate agreed upon, but not a skilled and able workman. There was no maximum of wages fixed. There would be difference between a highly-skilled workman and an unskilled workman, both being what are called competent men.—Mr. Roebuck: Do you know any distinct money difference between the two men? No, I do not. Mr. Harrison: Supposing the case of a man who is stronger than most men, who is also more skilful than most men, and who can with perfect ease to himself produce more stonework and better stonework, say in a day, than most men can, and can do so without intentionally momentarily exerting himself, does Rule II. prevent him from so working or not? Certainly it does. This rule the witness considered to cultivate efficiency. He said it was only introduced at the last revision, and very probably might be expunged at the next. You would fine the good man and the better workman because he was a good man and a better workman? According to that rule.—Mr. Matthews: Supposing the employer were to say, "This is a very valuable and good workman, therefore I will employ him notwithstanding that he has been excluded from the union," would the union men in that case strike till that man was discharged by his employer? Yes, as far as that man was concerned they would do so. A mutual code of rules had in many cases been found to work well in promoting harmony and preventing strikes.—Sir D. Gooch: You do not allow a bricklayer to lay stone at all, do you? No.—Mr. Matthews: So that if a bricklayer were to lay stonework and there were other work to be done on that particular job by stonemasons, they would make him undo that work before they would go to their work; and that would be consistent with your regulations, would it not? Yes; but, on the other hand, I may remark that our men do not interfere with brick-work. The Chairman: Has not your experience led you to know that in every country place in England you will find the same men building a stone wall with brick quoins, or a brick wall to a house with stone quoins? I do not think that it would be so except in some small country places.

THE THAMES EMBANKMENT AND THE METROPOLITAN DISTRICT RAILWAY.

AT the last meeting of the Metropolitan Board of Works, the Works and General Purposes Committee brought up a report in reference to the construction of the Metropolitan District Railway along the embankment and new street to the Mansion House. The Committee had received from the company's solicitor a communication embodying the terms of the arrangement proposed by the company, and recommended as follows:—

"That with a view to hasten the works from Blackfriars to Cannon-street, to prevent further discussion and delay, the Board should now agree to suspend taking any immediate steps for payment of the sum of 200,000*l.*, the minimum sum referred to in the 61st section of the Act of 1864, or for one year from this date; that interest on that sum be demanded by the Board during that year; that the company bind themselves by an agreement to proceed as rapidly as the Board shall require with the works between Blackfriars and Cannon-street, and that the company without delay find the funds for this purpose; that the company bind themselves to secure to the Board the payment of the same 200,000*l.* at the end of the year, and, in any event, interest at the rate of 5 per cent. per annum, to begin to run from the end of the year until the 200,000*l.* are paid; that this arrangement shall be no waiver of the powers of the Board, under the Acts of 1862 and 1864, or either of them, and that the company shall be bound, not later than one year from this date, to proceed effectually with the works along the embankment, with a view to their completion by the time stipulated by the existing Act of 1864."

The report was unanimously adopted.

THE METROPOLITAN FIRE-BRIGADE REPORT.

CAPTAIN SHAW, the chief officer of the fire-brigade, some weeks ago laid his annual report before the Metropolitan Board of Works. It states that the number of calls received during 1866 was 1,543; of these 103 were false alarms, 102 proved to be only chimney alarms, and 1,338 were fires of which 326 resulted in serious damage, and 1,012 in slight damage. The fires of 1866 show a decrease of 164 as compared with those of 1865; but taking an average of 33 years, there was an increase last year of 457. The proportion of serious to slight damages was 34 per cent. in 1865, but in 1866 only 25 per cent. The strength of the brigade on 1st January, 1867, amounted to 2 floating steam fire-engines, 7 large land steam fire-engines, 14 small land steam fire-engines, 64 manual engines, and 230 firemen. Since the reconstitution of the brigade there has been an increase of 49 engines and 101 men. The stations have also been increased from 19 to 41.

The cost of the brigade service for 1866 was about 53,000*l.* The Treasury contributes 10,000*l.*; the fire-insurance companies, 11,285*l.* 14s. 8d.; and the several parishes (by a rate of a half-penny in the pound), 31,795*l.* 13s. 9d.

The premises which took fire in 1866 were, private houses, 216; lodgings, 107; tenements, 18; offices, 10; hotels, club-houses, victuallers, and beershop keepers, 77; grocers, 29; bakers, 13; coffee and chop houses, 14; boot and shoe-makers, 27; booksellers and stationers, 17; printers, 10; builders, 19; carpenters and cabinet-makers, 44; clothiers, 12; drapers, woollen and linen mercers, 39; corn chandlers, 11; chandlers, 12; furniture brokers, 12; green-

grocers and fruiterers, 19; laundries, 12; oil and colourmen, 17; rag merchants, 12; stables, 29; tailors, 15; tinmen and braziers, 10; tobacconists, 12; and houses being built and under repair, 20. There were also 2 at fireworkmakers, 2 at gasworks, 1 hospital, 5 lucifer-match makers, 3 match-box makers, 8 marine-store dealers, 1 music-hall, 2 newspaper offices, 1 powder-mill, 8 schools, 1 tar distiller, 5 warehouses, 8 wine and spirit merchants, and 3 workhouses.

Of the 1,338 fires, the causes of 589 were unknown, and 7 doubtful, leaving 742 ascertained causes, amongst which were,—candle, 171; sparks from fire and chimneys, 82; gas, 139 (including 58 from escape of gas, 2 from seeking for escape of gas with lighted candle, and 2 by heat from sunlight burner); airing bedding and linen, 14; children 27 (including 19 playing with lucifers and 8 playing with fire); lucifers, 17; flues blocked up, foul, over-heated, or defective, 78; hot ashes and cinders, 23; lamps, 21 (including 14 paraffine accidents and 1 cat upsetting a lamp); stoves—overheating, bad pipes, and defective setting, 39; smoking tobacco, 17; light thrown down area, 10; boilers, coppers, furnaces, and ovens, 20; crinoline, 2; fireworks, 2; fumigating bugs (in lodgings), 2; fusees, 3; incendiarism, 4; lime-slaking, 6; naphtha (exploding and upsetting), 2; paraffine, 1; spontaneous ignition, 6 (1 at a marine-store dealer's, 1 at a rag-merchant's, 1 at a printer's, and 1 at a newspaper-office); and wax-tapers, 2.

Fires do not appear to occur especially at any particular seasons of the year.

BRICK PATENTS.

Apparatus for Manufacturing and Pressing Fire Bricks.—*C. J. Condrace & J. Field.* Dated 17th January, 1866.—Upon the main driving-shaft of the machine, which is driven direct by a steam-engine of suitable power, is keyed a bevel wheel, which, by means of a similar wheel keyed upon a vertical shaft, drives a pair of grinding stones mounted upon a horizontal axis carried by the said vertical shaft. These stones roll upon a circular bed, and are for the purpose of grinding up the clay or other material, which then falls into a receiver beneath. From this receiver the ground clay or other material is carried up and deposited in the pug or puddling mill by means of an endless travelling chain of buckets passing over rollers and driven by toothed gearing from the same main driving-shaft. The clay or other material is kneaded and brought to a proper consistency by means of knives or paddles fixed to a vertical revolving shaft driven by a pair of bevel wheels. Beneath the pug or puddling mill is a cylinder, into which the clay or other material passes by gravitation, the lower end of the cylinder being contracted and furnished with plates which slope towards a square receiver, the bottom of which is divided into two openings, each of the form and size of a brick. Below this receiver is a sliding frame provided with two pairs of moulds, and caused to slide backwards and forwards by means of a chain actuated by a mangle-wheel and pinion driven from the main shaft by a pair of bevel wheels; or the sliding motion may be obtained by a crank. At each side of the pug-mill is a press driven by a crank shaft or an eccentric, in such a manner that their action is alternate, and takes place at the precise moment when the sliding frame is at the full extent of its movement in either direction, and before its motion is reversed by the mangle wheel or crank. The distance between the two pairs of moulds is the same as the distance between the receiver and either of the presses, so that, whilst one pair of moulds is being filled with clay, the other pair is under the action of one or other of the presses, and *vice versâ*. As each pair of bricks is successively pressed, they are elevated from the moulds and placed upon endless travelling belts by means of an elevating apparatus driven by a crank or eccentric actuated by the same crank shaft which drives the presses.

Brick-making Machines.—*J. H. Johnson.* A communication. Dated 29th June, 1866.—This invention relates partly to certain improvements in the brick-making machine for which letters patent where granted to G. Haseltine, 8th July, 1863, and has special reference to that class of machines wherein bricks are made from untempered clay; also to a peculiar arrangement and combination of machinery or apparatus for controlling or stopping and starting brick-making machines. According to this invention it is, among other features, proposed to place inside the inclined hopper which supplies the granulated clay to the reciprocating mould-plate or frame, a movable partition, vibrating on a fixed centre in the hopper, and actuated by means of a rod and vertical lever, which derive their motion from the reciprocating mould-plate. The object of this arrangement is to change periodically the direction of the current of clay from the set of filled moulds to the set of empty or partially-filled moulds in the mould-plate. The pistons or followers, together with the bricks contained in the moulds, are slightly elevated or started preparatory to expelling the bricks by causing the lower ends of the piston-rods to pass on to fixed inclined planes, whilst the mould-plate is moving in one direction or the other. Heads or flanges are formed on the lower ends of the piston-rods of the two sets or groups of moulds in the mould-plate, and these heads or flanges, as well as the two fixed inclines before referred to, are divided in the direction of motion of the mould-plate, one-half of the contact surfaces being raised or made to project slightly beyond the other half, the raised surface in the head or flanges of the two sets of piston-rods and their corresponding inclines being on opposite sides, so that when the heads of one set of piston-rods traverse over one side of the said inclines, they will be slightly elevated thereby, but will remain depressed whilst traversing over the other incline. At the higher end of each of the fixed inclines there is situate a wheel or pulley of two diameters, the periphery of the larger diameter projecting slightly above the level of the raised side or half of the incline, and being in a direct line therewith, whilst the smaller diameter coincides with the sunk portion or half of the incline. Now as the heads or flanges of one set of pistons pass in succession over this pulley, they will each be still further elevated by causing the corresponding piston to compress the clay in the mould against the under side of a fixed plate which extends across and is in contact with the surface of the mould-plate. There are two of these fixed plates, viz., one just outside each side of the hopper, and, if desired, they may be made hollow, so as to be heated by the introduction of steam therein. After passing over the wheels or pulleys above referred to, the several heads or flanges of one set of pistons enter the groove of a lifter, which serves to expel the bricks from the mould by elevating the pistons flush with the surface of the mould-plate.

Improvements in the Making of Bricks.—*H. A. Bonneville.*—A communication. Dated 2nd July, 1866.—This invention relates to certain improvements in the manufacture of hollow bricks for the construction of ceilings in rooms and apartments. To attain this the bricks are provided at each end of their extremities with a projection, which, when they are placed between the beams that support the flooring, rest upon and are maintained by pits which run along the sides of the beams. The lower part of each brick is so disposed as to cover about half the interior side of the beam, so that when all the bricks are fixed and placed together, their lower surface presents one uniformly plane superficies which forms the ceiling.

Machinery for Manufacturing Bricks.—*D. Nichols* and *W. B. Leachman.* Dated 4th July, 1866. The object of this invention is not only to form or mould the brick of the required size, but likewise to press the clay during the operation of forming or moulding, and thus to deliver it a pressed brick. For this purpose, on two strong and suitable side-frames, placed parallel to each other, the patentees mount transversely, and on the same horizontal line, two crushing rollers, set at convenient distances apart for the admission of clay, which is furnished from a hopper placed over the rollers, and screwed to the side frames. The rollers may, if desired, have smooth peripheries, but the patentees prefer to have them slightly grooved spirally and in opposite directions — that is, right and left-handed, in order to produce a superior crushing effect when foreign matter is mingled with the clay, and also to prevent the caking of the same. On the front part of the frame they mount the driving shaft, which may be either put in motion by ordinary gearing, or by belting. On this shaft they place a double-grooved cam. In the one groove they place a pin connected to a die rod, which has a reciprocal motion, and works horizontally underneath the crushing rollers, the die being of the same dimensions in length and depth as the required brick. The groove on the opposite side of the cam has a pin connected by means of a guide rod and pin to a horizontal lever, which in turn is connected to a knife working in half grooves horizontally over the die. The knife cuts off or separates the clay in the mould from that which is in the space between the rollers and the mould. The mould is formed of fixed and movable pieces, the latter being the sides and top of knife. The horizontal lever above named, which is connected to the knife, carries also a pin, which works on the slotted shorter arm of a lever keyed to a cross shaft between the frames. The longer arm of this lever is connected by means of a rod to a bell-cranked lever at the delivering or back part of the machine. The upper arm of this latter lever raises or depresses a door, which forms one of the sides of the mould.

THE BUILDERS' CLERKS' BENEVOLENT INSTITUTION.

A list of subscribers and donors to the 31st of March has been issued, from which we are glad to learn that fair progress is being made towards the complete establishment of this Institution. The Committee have already 500*l.* in hand, and a numerous list of annual subscribers. If all who ought to exert themselves were to do so, as only a few have hitherto done, the first annual meeting in August might carry everything before it in a very remarkable manner; and we hope that all interested will rouse themselves to a sense of what they ought to do towards an end so important to the widow and orphan as the establishment of this benevolent institution.

THE INSTITUTION OF CIVIL ENGINEERS.

On April 2nd, the paper read was "A Memoir on the River Tyne," by Mr. W. A. Brooks. It contained a description of the tidal phenomena of the river, in its condition previous to being placed, in 1842, under the charge of the author for its improvement, as contrasted with the phenomena which were found to exist after the completion of the river works. These works consisted, mainly, in the first instance, of timber jetties, subsequently connected by river walls, formed of rubble mixed with ships' ballast, which was brought into the harbour and discharged into the line of the river works, affording an example of how much good might be effected in a port by the judicious application of available materials. The whole of the works, on both sides of a navigation of 10 miles in length, forming what were locally called "The Tyne Improvement Works," were executed out of a revenue applicable to them, not amounting to more than 5,000*l.* a year, or to 80,000*l.*, spread over a period of about sixteen years. Northumberland Dock, inclosing a reclamation from the river of above 70 acres, and the Tyne Piers, had been, or were being executed, out of separate funds.

Much of the interest of the paper consisted of a dissertation upon the cause of the formation of bars at the mouths of rivers, and the means available for their amelioration, according to the well-known theory of the author, that "Bars owe their existence to the confliction which takes place between the current of the early flood tide and that of the ebb, where shoals exist, preventing the free drainage of the backwater during the proper period of the discharge of the ebb."

"GIVE EVERY ONE HIS OWN."

Sir,—Your correspondent, "Mr. S. J. Nichol," has endeavoured to play a part, which I venture to believe he will hardly be equal to sustain. He appears in your pages as the injured originator of a style of roof, the principle of which I have adopted at Peckham and elsewhere; and I have no hesitation in saying that had his memory been better, or had he looked further, he would have said less.

The facts of the case are these:—In 1859, Mr. Nichol, myself, and several other architects, competed for the church of SS. Peter and Paul, Cork. My original drawings, which were exhibited both in Cork and at the Architectural Exhibition in London, show the design now called in question. This fact, I humbly submit, is sufficient to clear me from the charge of "plagiarism." The first time I saw Mr. Nichol's drawings was some months after the competition had taken place, when both designs appeared in the same exhibition. I was then somewhat struck at seeing that the same principle had been adopted by Mr. Nichol; but knowing him to be an architect of some original power, I imagined at the moment that we had both hit upon the same idea. It never occurred to me that he might possibly have seen my church in Eldon-street, Liverpool, which was designed two years previously, and actually

advance of wages, a reduction of the hours of labour, and a general redress of grievances formerly complained of. The directors say that the men have struck work without giving any formal notice beforehand; but the men explain that they only struck work after many vain endeavours had from time to time been made to avoid such a course; and that it was only after they found that the directors would do nothing to redress their grievances that they struck work. The drivers and stokers on other sections of the North-Eastern have also struck, and the directors have endeavoured to obtain a decision of the magistrates against the men for breach of contract; but the case selected was dismissed on the ground that the contract was one-sided. The traffic on some of the branch lines has been discontinued; but the directors, it is said, are obtaining new hands, and gradually restoring the traffic, both on the main line and on the branches. That the drivers and stokers *have* grievances which ought to be redressed, especially as regards overtime, seems evident. A metropolitan meeting of engine-drivers and firemen have resolved to support the men of the North-Eastern line.——The Great Northern engine-drivers and firemen having memorialized their directors for a reduction of the hours of labour and an increase of wages, have had their claims granted so as to leave no cause of complaint. In future, ten hours will constitute the day's work; and for all time worked beyond, the pay will be reckoned at eight hours per day. The drivers will have 5s. 6d. a day for the first year, 6s. for the second, and 7s. for the third; while the firemen will have 3s. 6d., 3s. 9d., and 4s. respectively. For Sunday work, time and a half will be given; and a nine hours' interval will be allowed after day's work, except on urgent occasions.——The strike which took place of the navvies employed on the extension of the Midland Railway at Somers Town, &c., for an increase of wages from 3s. 9d. to 4s. a day, is said to have had no connexion, as rumoured, with the introduction of Belgian navvies. The men, about 400 in number, were paid off by the contractors, who it is said will have no difficulty in supplying their places with others at the old rate of payment.

THE TRADES UNION COMMISSION.

THE evidence already taken has been very voluminous. Some of the more important witnesses have been the secretaries of the various societies. Among these was Mr. E. Coulson, secretary of the Operative Bricklayers' Society, of London. He said the society numbered 5,700 members, and had 96 branches. The increase of members was 700 last year, and the funds, up to December, were about 3,200*l.* in hand; the income for the previous year was about 2,700*l.* The objects of the society had reference to trade purposes, and burial and travelling relief to the members. The amount for men travelling about the country was very small, and the money expended for strikes during a year would not amount to more than 300*l.* or 400*l.*—at least, it had not gone beyond that since 1861. Where lodges had recently been established they had, in consequence of the organisation of the men, succeeded in obtaining a satisfactory advance of wages without any protracted strike. No member of the society in any district could enter on a strike without the consent of the whole of the members of the society—that was to say, of the majority of the members. The executive in many instances have prevented strikes taking place in districts, considering that it would be perfect madness on the part of the men to enter into those contests. . . . The cause of strike in recent years had been that the employers had endeavoured to force upon the men rules that were considered objectionable by them, with reference to the hours of working and the rate of wages. The men in each district determined what was the proper rate of wages, proceeding upon the principle of the prices of food, house-rent, &c. An equivalent in wages was decided by the general average of the number of bricks a man could lay in a day; if the work was inferior, he could lay more; if superior, less. Not the slightest objection was made by the men to hard bricks. . . . Mr. Roebuck: Do they object to bricks made by machinery?—No. . . . So that if persons have taken out a patent for making bricks by machinery, you have never known of the trade refusing to use those bricks?—Not in the London district. . . Therefore, it is totally untrue that a patentee has been ruined, because his bricks have not been accepted, and would not be received by any portion of the London trade?—Totally untrue in the London district. . . . Have you ever known it in any other?—I do not know it in any other. There was a high moral feeling against the practice of scamping work, and trades' unions had caused the work to be done in a manner superior to what it was before: decidedly a more honourable feeling had been promoted by trades' unions. There were no secret rules, and the bye-laws were in conformity with the general rules. In Edinburgh, Coatbridge, Burslem, Longton, Newcastle, and other places, there were rules which had been agreed to between the masters and the men, and these rules had been found to prevent the occurrence of disputes. . . . Mr. Harrison: It is said that the society has a rule forbidding a member to put down his trowel and lay bricks with both hands. Is there any such rule in existence?—There is no such rule in existence, and no such custom. . . . On being asked by Mr. Mathews,—Is there any restriction laid upon the clever workman as to the rapidity with which he shall work?—The witness replied in the negative. . . . You have no restriction then in your society such as they have in the Stonemasons' Society, against what is called "chasing," that is to say, a man working more rapidly than others?—No such rule at all. . . . There would be no objection to a clever man laying bricks by the thousand if he wished to do so, and thereby to increase his daily wage. The society had an objection to piece-work, believing it made men slovenly and careless, but there was no rule against it, and the men would not object to work with a man who was working by piece. If men struck for such a cause the society would not support them in the strike. There was no rule against working overtime, and no objection had ever been made to any number of apprentices when they were legally bound to the employer. The society objected to a labourer being taken from the hod and put to the trowel. The masons opposed any setting of stone by bricklayers, and witness's society felt that their own men were inexperienced in stonework, and therefore could only set the stone in a very careless way; but as to putting on stone coping or odd jobs of stonework, they could do it as well as the masons, and the latter would have no power over that. On railways witness had known compost cast put in side walls instead of bricks; the employers shut their eyes to it, and the clerk of the works was in fault. . . . The Chairman: They all try to get as much money as they can for as loose work as possible, you think?—Yes. . . . Sometimes the eyes of the clerk of the works were shut purposely. The society did nothing to encourage these practices. . . . Mr. Harrison: Does it do anything to oppose them where it can?—We should not meet with any encouragement from the employers if we did. . . . There was more reality and honesty in the old work than in the modern; in an old piece of work the mortar was hard and sound, but all kinds of rubbish were now used to make mortar, and in a few years it crumbled to pieces. This did not arise at all from a superior knowledge of making mortar formerly. Give the men time and material, and they could do anything. As a general rule, work was better done in the last century than now. . . . Mr. Roebuck: And that in spite of the existence of trades' unions now?—Yes, we are only too happy to do the work as well as possible, but we often have no encouragement to do it as well as it might be done. Bricks were superior now to what they used to be, but the mortar was worse, and the work was not so honestly done. A great deal of time was saved by making inferior mortar, besides the saving of material. Witness knew for a fact that in a certain house on which he once worked there were 20,000 bricks, when there ought to be 73,000. All the bottom part of the house was filled up with the old foundations of other houses that had been carted there; then, pockets, or places 14 in. by 9 in., or 14 in. square, which should have been filled in with brick, were carried up in the top part of the house to within four or five courses of the next floor. These "pockets" were left with the knowledge of the master. This job was not sub-contracted to the men, so that they got nothing by the pockets being left. . . . Mr. Roebuck: You say this occurred not in piecework, but in daywork?—Day-work. . . . Therefore this roguery took place under the very circumstances which you say are sought by you for the purpose of preventing roguery?—In that instance it was so, but you cannot compare a public work and the speculative buildings to which I have referred; those houses are simply erected to sell; it is not quality that they want there, but quantity. . . . By Mr. Harrison: The cause of this "scamping" was a desire to erect the building as quickly as possible, merely to sell, and nothing that the union had done affected it in any way whatever.

Mr. Richard Harnott, secretary of the Friendly Society of Operative Masons, said that the society had 278 branches. The income of the society from November 30, 1865, to November 29, 1866, was 17,746*l.* 4s. 11d½., and there was a general or reserve fund amounting at present to about 10,000*l.*, besides a little in the various lodges. There were branches in England and Wales, but none in Scotland. The society increased last year by 4,860 members. The objects of the trade society were to protect the members from all encroachments by employers, as well as to maintain the rate of wages generally. When a branch wished to give notice of a rise of wages, the consent of the society had to be obtained. If the society granted the application, then the employers received a notice of three or six months, allowing time to finish contracts on hand. The central committee never suggested to the men that they ought to apply for an advance, or take any part in beginning the demand. It was not the object of the society to equalize wages throughout England, or to compel employers to pay an inferior workman more than he was worth. There was no provision to prevent a member of the society, not being a competent man, from working for lower wages than the rate which was sanctioned for his district. If he was a competent man he was not free to work for lower wages. If he did so there was a rule to impose a penalty on him. The society did not recognise piece-work, and they fined a man for working by the piece where piece-work had been abolished. A reasonable number of apprentices was allowed, and there was no rule establishing a limit. It was left to each branch. There was a rule against overtime unless in case of emergency, which very often arose in the building trades. The witness considered that the effect of the society upon the men had been to improve them in character, social position, and energy; and there had been a great improvement in wages in the last few years—whether on account of the operation of the society or on account of the improvement of the building trades of the country generally he could not say. In some places employers had actually advanced wages of themselves in order to secure a sufficient number of men to perform their work. If a master took more apprentices than the men in the shop thought was right—and the number was regulated according to each shop, not according to each branch—then the men complained to the lodge, and the lodge to the society. Generally a delegate went from the lodge to the master, and if he refused to redress the grievance, the witness supposed there would be a disturbance or dispute, but there never had occurred throughout the whole trade any suspension of labour in consequence of the employ of an excess of apprentices.—Mr. Roebuck: What is the advantage which you expect from a reduced number of hours of work, rather than from increased wages? It is considered that it causes more men to be employed; there is work for an increased number of hands. Old and infirm members were allowed to take lower wages, at a rate agreed upon, but not a skilled and able workman. There was no maximum of wages fixed. There would be difference between a highly-skilled workman and an unskilled workman, both being what are called competent men.—Mr. Roebuck: Do you know any distinct money difference between the two men? No, I do not. Mr. Harrison: Supposing the case of a man who is stronger than most men, who is also more skilful than most men, and who can with perfect ease to himself produce more stonework and better stonework, say in a day, than most men can, and can do so without intentionally momentarily exerting himself, does Rule II. prevent him from so working or not? Certainly it does. This rule the witness considered to cultivate efficiency. He said it was only introduced at the last revision, and very probably might be expunged at the next. You would fine the good man and the better workman because he was a good man and a better workman? According to that rule.—Mr. Matthews: Supposing the employer were to say, "This is a very valuable and good workman, therefore I will employ him notwithstanding that he has been excluded from the union," would the union men in that case strike till that man was discharged by his employer? Yes, as far as that man was concerned they would do so. A mutual code of rules had in many cases been found to work well in promoting harmony and preventing strikes.—Sir D. Gooch: You do not allow a bricklayer to lay stone at all, do you? No.—Mr. Matthews: So that if a bricklayer were to lay stonework and there were other work to be done on that particular job by stonemasons, they would make him undo that work before they would go to their work; and that would be consistent with your regulations, would it not? Yes; but, on the other hand, I may remark that our men do not interfere with brick-work. The Chairman: Has not your experience led you to know that in every country place in England you will find the same men building a stone wall with brick quoins, or a brick wall to a house with stone quoins? I do not think that it would be so except in some small country places.

THE THAMES EMBANKMENT AND THE METROPOLITAN DISTRICT RAILWAY.

AT the last meeting of the Metropolitan Board of Works, the Works and General Purposes Committee brought up a report in reference to the construction of the Metropolitan District Railway along the embankment and new street to the Mansion House. The Committee had received from the company's solicitor a communication embodying the terms of the arrangement proposed by the company, and recommended as follows:—

"That with a view to hasten the works from Blackfriars to Cannon-street, to prevent further discussion and delay, the Board should now agree to suspend taking any immediate steps for payment of the sum of 200,000*l.*, the minimum sum referred to in the 61st section of the Act of 1864, or for one year from this date; that interest on that sum be demanded by the Board during that year; that the company bind themselves by an agreement to proceed as rapidly as the Board shall require with the works between Blackfriars and Cannon-street, and that the company without delay find the funds for this purpose; that the company bind themselves to secure to the Board the payment of the same 200,000*l.* at the end of the year, and, in any event, interest at the rate of 5 per cent. per annum, to begin to run from the end of the year until the 200,000*l.* are paid; that this arrangement shall be no waiver of the powers of the Board, under the Acts of 1862 and 1864, or either of them, and that the company shall be bound, not later than one year from this date, to proceed effectually with the works along the embankment, with a view to their completion by the time stipulated by the existing Act of 1864."

The report was unanimously adopted.

THE METROPOLITAN FIRE-BRIGADE REPORT.

CAPTAIN SHAW, the chief officer of the fire-brigade, some weeks ago laid his annual report before the Metropolitan Board of Works. It states that the number of calls received during 1866 was 1,543; of these 103 were false alarms, 102 proved to be only chimney alarms, and 1,338 were fires of which 326 resulted in serious damage, and 1,012 in slight damage. The fires of 1866 show a decrease of 164 as compared with those of 1865; but taking an average of 33 years, there was an increase last year of 457. The proportion of serious to slight damages was 34 per cent. in 1865, but in 1866 only 25 per cent. The strength of the brigade on 1st January, 1867, amounted to 2 floating steam fire-engines, 7 large land steam fire-engines, 14 small land steam fire-engines, 64 manual engines, and 230 firemen. Since the reconstitution of the brigade there has been an increase of 49 engines and 101 men. The stations have also been increased from 19 to 41.

The cost of the brigade service for 1866 was about 53,000*l.* The Treasury contributes 10,000*l.*; the fire-insurance companies, 11,285*l.* 14s. 8d.; and the several parishes (by a rate of a half-penny in the pound), 31,795*l.* 13s. 9d.

The premises which took fire in 1866 were, private houses, 216; lodgings, 107; tenements, 18; offices, 10; hotels, club-houses, victuallers, and beershop keepers, 77; grocers, 29; bakers, 13; coffee and chop houses, 14; boot and shoe-makers, 27; booksellers and stationers, 17; printers, 10; builders, 19; carpenters and cabinet-makers, 44; clothiers, 12; drapers, woollen and linen mercers, 39; corn chandlers, 11; chandlers, 12; furniture brokers, 12; green-

grocers and fruiterers, 19; laundries, 12; oil and colourmen, 17; rag merchants, 12; stables, 29; tailors, 15; tinmen and braziers, 10; tobacconists, 12; and houses being built and under repair, 20. There were also 2 at fireworkmakers, 2 at gasworks, 1 hospital, 5 lucifer-match makers, 3 match-box makers, 8 marine-store dealers, 1 music-hall, 2 newspaper offices, 1 powder-mill, 8 schools, 1 tar distiller, 5 warehouses, 8 wine and spirit merchants, and 3 workhouses.

Of the 1,338 fires, the causes of 589 were unknown, and 7 doubtful, leaving 742 ascertained causes, amongst which were,—candle, 171; sparks from fire and chimneys, 82; gas, 139 (including 58 from escape of gas, 2 from seeking for escape of gas with lighted candle, and 2 by heat from sunlight burner); airing bedding and linen, 14; children 27 (including 19 playing with lucifers and 8 playing with fire); lucifers, 17; flues blocked up, foul, over-heated, or defective, 78; hot ashes and cinders, 23; lamps, 21 (including 14 paraffine accidents and 1 cat upsetting a lamp); stoves—overheating, bad pipes, and defective setting, 39; smoking tobacco, 17; light thrown down area, 10; boilers, coppers, furnaces, and ovens, 20; crinoline, 2; fireworks, 2; fumigating bugs (in lodgings), 2; fusees, 3; incendiarism, 4; lime-slaking, 6; naphtha (exploding and upsetting), 2; paraffine, 1; spontaneous ignition, 6 (1 at a marine-store dealer's, 1 at a rag-merchant's, 1 at a printer's, and 1 at a newspaper-office); and wax-tapers, 2.

Fires do not appear to occur especially at any particular seasons of the year.

BRICK PATENTS.

Apparatus for Manufacturing and Pressing Fire Bricks.—*C. J. Condrace & J. Field.* Dated 17th January, 1866.—Upon the main driving-shaft of the machine, which is driven direct by a steam-engine of suitable power, is keyed a bevel wheel, which, by means of a similar wheel keyed upon a vertical shaft, drives a pair of grinding stones mounted upon a horizontal axis carried by the said vertical shaft. These stones roll upon a circular bed, and are for the purpose of grinding up the clay or other material, which then falls into a receiver beneath. From this receiver the ground clay or other material is carried up and deposited in the pug or puddling mill by means of an endless travelling chain of buckets passing over rollers and driven by toothed gearing from the same main driving-shaft. The clay or other material is kneaded and brought to a proper consistency by means of knives or paddles fixed to a vertical revolving shaft driven by a pair of bevel wheels. Beneath the pug or puddling mill is a cylinder, into which the clay or other material passes by gravitation, the lower end of the cylinder being contracted and furnished with plates which slope towards a square receiver, the bottom of which is divided into two openings, each of the form and size of a brick. Below this receiver is a sliding frame provided with two pairs of moulds, and caused to slide backwards and forwards by means of a chain actuated by a mangle-wheel and pinion driven from the main shaft by a pair of bevel wheels; or the sliding motion may be obtained by a crank. At each side of the pug-mill is a press driven by a crank shaft or an eccentric, in such a manner that their action is alternate, and takes place at the precise moment when the sliding frame is at the full extent of its movement in either direction, and before its motion is reversed by the mangle wheel or crank. The distance between the two pairs of moulds is the same as the distance between the receiver and either of the presses, so that, whilst one pair of moulds is being filled with clay, the other pair is under the action of one or other of the presses, and *vice versâ*. As each pair of bricks is successively pressed, they are elevated from the moulds and placed upon endless travelling belts by means of an elevating apparatus driven by a crank or eccentric actuated by the same crank shaft which drives the presses.

Brick-making Machines.—*J. H. Johnson.* A communication. Dated 29th June, 1866.—This invention relates partly to certain improvements in the brick-making machine for which letters patent where granted to G. Haseltine, 8th July, 1863, and has special reference to that class of machines wherein bricks are made from untempered clay; also to a peculiar arrangement and combination of machinery or apparatus for controlling or stopping and starting brick-making machines. According to this invention it is, among other features, proposed to place inside the inclined hopper which supplies the granulated clay to the reciprocating mould-plate or frame, a movable partition, vibrating on a fixed centre in the hopper, and actuated by means of a rod and vertical lever, which derive their motion from the reciprocating mould-plate. The object of this arrangement is to change periodically the direction of the current of clay from the set of filled moulds to the set of empty or partially-filled moulds in the mould-plate. The pistons or followers, together with the bricks contained in the moulds, are slightly elevated or started preparatory to expelling the bricks by causing the lower ends of the piston-rods to pass on to fixed inclined planes, whilst the mould-plate is moving in one direction or the other. Heads or flanges are formed on the lower ends of the piston-rods of the two sets or groups of moulds in the mould-plate, and these heads or flanges, as well as the two fixed inclines before referred to, are divided in the direction of motion of the mould-plate, one-half of the contact surfaces being raised or made to project slightly beyond the other half, the raised surface in the head or flanges of the two sets of piston-rods and their corresponding inclines being on opposite sides, so that when the heads of one set of piston-rods traverse over one side of the said inclines, they will be slightly elevated thereby, but will remain depressed whilst traversing over the other incline. At the higher end of each of the fixed inclines there is situate a wheel or pulley of two diameters, the periphery of the larger diameter projecting slightly above the level of the raised side or half of the incline, and being in a direct line therewith, whilst the smaller diameter coincides with the sunk portion or half of the incline. Now as the heads or flanges of one set of pistons pass in succession over this pulley, they will each be still further elevated by causing the corresponding piston to compress the clay in the mould against the under side of a fixed plate which extends across and is in contact with the surface of the mould-plate. There are two of these fixed plates, viz., one just outside each side of the hopper, and, if desired, they may be made hollow, so as to be heated by the introduction of steam therein. After passing over the wheels or pulleys above referred to, the several heads or flanges of one set of pistons enter the groove of a lifter, which serves to expel the bricks from the mould by elevating the pistons flush with the surface of the mould-plate.

Improvements in the Making of Bricks.—*H. A. Bonneville.*—A communication. Dated 2nd July, 1866.—This invention relates to certain improvements in the manufacture of hollow bricks for the construction of ceilings in rooms and apartments. To attain this the bricks are provided at each end of their extremities with a projection, which, when they are placed between the beams that support the flooring, rest upon and are maintained by pits which run along the sides of the beams. The lower part of each brick is so disposed as to cover about half the interior side of the beam, so that when all the bricks are fixed and placed together, their lower surface presents one uniformly plane superficies which forms the ceiling.

Machinery for Manufacturing Bricks.—*D. Nichols* and *W. B. Leachman.* Dated 4th July, 1866. The object of this invention is not only to form or mould the brick of the required size, but likewise to press the clay during the operation of forming or moulding, and thus to deliver it a pressed brick. For this purpose, on two strong and suitable side-frames, placed parallel to each other, the patentees mount transversely, and on the same horizontal line, two crushing rollers, set at convenient distances apart for the admission of clay, which is furnished from a hopper placed over the rollers, and screwed to the side frames. The rollers may, if desired, have smooth peripheries, but the patentees prefer to have them slightly grooved spirally and in opposite directions — that is, right and left-handed, in order to produce a superior crushing effect when foreign matter is mingled with the clay, and also to prevent the caking of the same. On the front part of the frame they mount the driving shaft, which may be either put in motion by ordinary gearing, or by belting. On this shaft they place a double-grooved cam. In the one groove they place a pin connected to a die rod, which has a reciprocal motion, and works horizontally underneath the crushing rollers, the die being of the same dimensions in length and depth as the required brick. The groove on the opposite side of the cam has a pin connected by means of a guide rod and pin to a horizontal lever, which in turn is connected to a knife working in half grooves horizontally over the die. The knife cuts off or separates the clay in the mould from that which is in the space between the rollers and the mould. The mould is formed of fixed and movable pieces, the latter being the sides and top of knife. The horizontal lever above named, which is connected to the knife, carries also a pin, which works on the slotted shorter arm of a lever keyed to a cross shaft between the frames. The longer arm of this lever is connected by means of a rod to a bell-cranked lever at the delivering or back part of the machine. The upper arm of this latter lever raises or depresses a door, which forms one of the sides of the mould.

THE BUILDERS' CLERKS' BENEVOLENT INSTITUTION.

A list of subscribers and donors to the 31st of March has been issued, from which we are glad to learn that fair progress is being made towards the complete establishment of this Institution. The Committee have already 500*l.* in hand, and a numerous list of annual subscribers. If all who ought to exert themselves were to do so, as only a few have hitherto done, the first annual meeting in August might carry everything before it in a very remarkable manner; and we hope that all interested will rouse themselves to a sense of what they ought to do towards an end so important to the widow and orphan as the establishment of this benevolent institution.

THE INSTITUTION OF CIVIL ENGINEERS.

On April 2nd, the paper read was "A Memoir on the River Tyne," by Mr. W. A. Brooks. It contained a description of the tidal phenomena of the river, in its condition previous to being placed, in 1842, under the charge of the author for its improvement, as contrasted with the phenomena which were found to exist after the completion of the river works. These works consisted, mainly, in the first instance, of timber jetties, subsequently connected by river walls, formed of rubble mixed with ships' ballast, which was brought into the harbour and discharged into the line of the river works, affording an example of how much good might be effected in a port by the judicious application of available materials. The whole of the works, on both sides of a navigation of 10 miles in length, forming what were locally called "The Tyne Improvement Works," were executed out of a revenue applicable to them, not amounting to more than 5,000*l.* a year, or to 80,000*l.*, spread over a period of about sixteen years. Northumberland Dock, inclosing a reclamation from the river of above 70 acres, and the Tyne Piers, had been, or were being executed, out of separate funds.

Much of the interest of the paper consisted of a dissertation upon the cause of the formation of bars at the mouths of rivers, and the means available for their amelioration, according to the well-known theory of the author, that "Bars owe their existence to the confliction which takes place between the current of the early flood tide and that of the ebb, where shoals exist, preventing the free drainage of the backwater during the proper period of the discharge of the ebb."

"GIVE EVERY ONE HIS OWN."

Sir,—Your correspondent, "Mr. S. J. Nichol," has endeavoured to play a part, which I venture to believe he will hardly be equal to sustain. He appears in your pages as the injured originator of a style of roof, the principle of which I have adopted at Peckham and elsewhere; and I have no hesitation in saying that had his memory been better, or had he looked further, he would have said less.

The facts of the case are these:—In 1859, Mr. Nichol, myself, and several other architects, competed for the church of SS. Peter and Paul, Cork. My original drawings, which were exhibited both in Cork and at the Architectural Exhibition in London, show the design now called in question. This fact, I humbly submit, is sufficient to clear me from the charge of "plagiarism." The first time I saw Mr. Nichol's drawings was some months after the competition had taken place, when both designs appeared in the same exhibition. I was then somewhat struck at seeing that the same principle had been adopted by Mr. Nichol; but knowing him to be an architect of some original power, I imagined at the moment that we had both hit upon the same idea. It never occurred to me that he might possibly have seen my church in Eldon-street, Liverpool, which was designed two years previously, and actually

carried into execution towards the end of 1858, almost two years previously to the competition. In order that there may be no misunderstanding, I transcribe copies of two letters from the builders, who tendered for the church alluded to, both of which bear out and verify my statement.*

After your readers have perused the above, probably, I shall be the only person who will not be led to the conclusion that Mr. Nichol simply describes his own *modus operandi*, whilst most unjustifiably attaching it to my name. E. WELBY PUGIN.

P.S.—With regard to the insinuation that I was the author of the account of the opening of Peckham Church, I beg emphatically to deny it.

MEPHITIC ATMOSPHERE OF THE UNDERGROUND RAILWAY.

SIR,—The reason of the deleterious state of the air to which your quotation from the *British Medical Journal* refers is, that the condensation of the visible smoke only has been aimed at, and not the removal of the source of evil. The engines are said to consume the smoke, but this is no more than rendering it invisible without lessening its really injurious action on the lungs. What is required is the complete removal of the products of combustion; this could be accomplished by erecting ventilating shafts near the middle of each length of tunnel, and establishing an upward current. Hot expansive steam and smoke would ascend these much more readily than condensed vapours, and the additional expense of the new form of engine might be saved. A. J. B.

"GIBBS'S FIRE-PLACE LINTEL."

SIR,—There is a short notice of this invention in your number for March 16, p. 197.

The lintel is of *cast* iron; would a district surveyor allow its use in London? The Building Act, s. 20, r. 3, states that "an arch of brick or stone, or a bar of *wrought* iron, must be built over the opening of every chimney to support the breast thereof." E. W. T.

RAIN THROUGH PORTLAND CEMENT.

THE rain comes through Portland cement on one part of the front of my house when the wind blows very strongly. Is there any wash which will render this no longer possible? and of what does it consist? or will painting be necessary? CLUB.

THE ROAD FROM HYDE PARK CORNER.

SIR,—It has often occurred to me that Mr. Snell's plan of opening a public road from Hyde Park-corner to Stanhope-gate is at once the most obvious, simple, and economical mode of diverting the traffic from the narrow portions of Park-lane. As explained in a recent number of the *Builder*, and as shown on the plan, the proposed road would, I think, be rather an improvement than otherwise to the park itself. I should not presume to suggest a further improvement, were I not encouraged by the approval betowed upon it by his Royal Highness the late Prince Consort, when named to him some years ago.

By opening out and levelling a small corner of the Green Park, and the unsightly length of road which runs parallel with Grosvenor-place, a thoroughfare on the east side of the gateway might be obtained, and the latter would stand an elevated triumphal arch in the centre of a handsome place, out of which the road to Constitution-hill would pass, at a right angle. The gateway, as it now stands, is an obstruction to the stream of traffic: its awkward position and the narrowness of the gorge leading into Hyde Park-corner, will at once be perceptible to any one approaching it from Grosvenor-place.

I venture to think the suggestion, if worked out by an architect of taste, might contribute still further to make Hyde Park-corner what "it should be." R. E. EGERTON WARBURTON.

Arley Hall, Northwich.

CHURCH-BUILDING NEWS.

Washington.—The parish church of Washington, near Storrington, Sussex, has been restored. About eighteen months ago the church consisted of a nave, with north aisle, of Early English date. Attached to the west of the aisle was the remnant of an Early English tower; whilst alongside of it stood a tower of the fifteenth century attached to the end of the nave. The chancel was a modern building. The south side of the nave has been greatly modernized, and the roof of the nave and aisle, as well as the north aisle wall, were in a ruinous state. This aisle and the nave have been rebuilt, with the exception of arches at the side of the nave, and a new aisle has been added on the south side. The modern chancel has been wholly rebuilt, in keeping with the rest of the edifice, the style followed throughout being that of the thirteenth century. The chancel is enriched with a carved reredos of alabaster and marbles of Ipplepere and Galway, and with a stained glass east window (by Messrs. Lavers & Barraud). Both the reredos and window are the gift of Colonel Sandham. The fittings are of stained deal, varnished, and the pavement is in Portland stone, divided into patterns by bands of Minton's tiles. The masonry is of Scaimes-hill sandstone, with the carving and mouldings in the native grey chalk. The architect employed was Mr. Gordon M. Hills, of London; and the builder, Mr. Bushby, of Littlehampton. The total cost of the restoration is about 2,500*l*. The new schools, which stand at a short distance from the church, have been erected at a cost of between 700*l*. and 800*l*.

Carlisle.—The new church of St. John the Evangelist has been consecrated. It has been erected upon a plot of ground in London-road, which formerly formed part of nursery gardens. In 1863 the Dean had succeeded in raising among friends at a distance from Carlisle nearly 1,500*l*.; and a competition among architects resulted in forty-one designs being submitted to the committee. Most of these were in the Early English style; and the successful competitors were Messrs. Clarke & Son, of Nottingham. The original estimate of the cost of the building was about 3,343*l*., the contract being let for that amount to Messrs. C. & J. Armstrong, of this city; but the sum did not include certain contemplated extras; and the additional expenses involved, for architect's commission, salary of clerk of the works, and other expenses incidental to the work, swelled the total cost to a little over 5,000*l*. The progress of the work was much delayed in consequence of the strikes in the building trade. The church is built entirely of white stone, from the Fairloam quarry of the contractors. A bell turret at the eastern side of the nave, with a stone spire, surmounted by a vane, gives a character to that side of the fabric. Interiorly the aisles are separated from the naves by pointed arches; the pulpit and reading-desk occupy similar positions at the opposite sides of the church; and a pointed arch spans the entrance to the chancel. Above the nave arches, and forming a feature of the interior, is a clearstory, with triple lancet windows in each bay. The large window at the west end is plain, but the east is filled with stained glass. To the north of the chancel is a vestry-room, 14 ft. by 10 ft.; while on the corresponding part of the building on the south side is an organ-chamber, 16 ft. by 14 ft. The vestry communicates with the north aisle by an arched doorway; while the organ-chamber communicates with the aisle and chancel by low arches resting upon solid columns. The dimensions of the nave, it may be added, are 87 ft. by 24 ft.; the aisles 87 ft. by 13 ft. each; and the chancel, 37 ft. by 22 ft.

Worcester.—St. Nicholas's church has been reopened. The alterations consist of the partial renewal of the roof, which was in a bad state: the high pews have been substituted by open sittings, with kneeling-boards and book-boxes: additional accommodation has thus been obtained. The tall prayer-desk and pulpit have been done away with, and a low reading-desk and new pulpit, in keeping with the other alterations, have been substituted. The high gallery front has been replaced by an open one—an oak arcade, ornamented with wrought-iron work, executed by Messrs. Skidmore & Co., of Coventry, who also supplied similar decorations for the open work of the pulpit and new Communion rail. The chancel and aisles have been laid with encaustic tiles supplied by Messrs. Godwin, of Lugwardine. The side windows have been reglazed, the small diamond-shaped panes substituted by larger panes, which it is intended eventually to surround by a border of coloured glass. The building is lighted by means of bracket burners and a central sunlight gas-burner, and is warmed by Haden's hot water apparatus. The ventilation will be obtained by means of the sunlight burner. The contractors were Messrs. Wood & Son, and the amount of their contract was 2,000*l*. Mr. J. W. Hopkins was the architect employed.

Haggerstone (Shoreditch). — The church of St. Augustine, the first of the three new Haggerstone churches, has been consecrated. The style of the church, which is from the design of Mr. H. Woodyer, of Graffham, Guildford, is Middle Pointed, and it is constructed to accommodate 936 persons. The building has cost about 9,000*l*., the site having cost in addition 2,000*l*. A parsonage and boys' school have also to be erected, for which funds are required. The organ is erected by Mr. Willis, a portion only of it being put in the church of the value of 300*l*., towards which only 100*l*. have been raised. Most of the ornamental part of the church has been omitted, to be added at a future period, when funds can be raised for the purpose.

* It is unnecessary to print these.—ED.

Books Received.

The International Horticultural Exhibition and Botanical Congress, 1866: Report of Proceedings. Printed by Truscott & Co., Suffolk-lane, City.

THE International Horticultural Exhibition, held in London from May 22nd to May 31st of last year, was excellently well conducted, and a decided success. The subscribers have had good reason to congratulate themselves on the result, and now they will be presented with a voluminous and valuable report of the proceedings, including various papers on cognate subjects, read at the Congress, and here printed in full. The volume contains between 400 and 500 pages of matter, imperial octavo, and is illustrated by engravings.

VARIORUM.

THE April No. of the *Art Journal* contains, as promised, the first part of the Illustrated Catalogue of the Universal Exhibition, with a wealth of engravings, some of them beautifully executed,—gems of wood engraving. On Sunday last, Mr. S. C. Hall had the honour of presenting the first number of the catalogue to the Emperor, at the Tuileries. We are not surprised to hear that it was most graciously received, his Majesty observing,—"It will be a wonderful work, when completed." The whole number, including the catalogue, for half-a-crown, is a marvellous specimen of cheap goodness.——The *Quarterly* has a clever paper descriptive of Westmoreland, and a paper on Railway Finance, which falls short of completeness.——Debrett's "Illustrated House of Commons, and the Judicial Bench, 1867," (Dean & Son) is a worthy companion of the "Peerage and Baronetage." It includes short biographies of all the members and their armorial bearings.——The April number of the *Revue Artistique et Littéraire* gives an account of the *Union Centrale des Beaux Arts appliqué à l'Industrie* established in Paris, and shows that it will have a wide scope and is destined to play an important part. The number is altogether an interesting one.——"Byron," for sevenpence, and sixteen illustrations (Dicks). It would be preferable at a shilling with better paper. Those who want the *complete* works must go to Mr. Murray.——The completion of vol. I. of "Scientific Papers read before the Royal Irish Academy," and published in its proceedings (Gill, Dublin, printer to the Academy), has been issued. It contains the title-page and table of contents, with papers on the construction of ancient galleys, by Lord de Ros; on armour-plated ships of war, by G. C. Garnet, M.R.I.A., and others, with plates illustrative of some of the papers.——"Journal of the Bath and West of England Society for the Encouragement of Agriculture, Arts, Manufactures, and Commerce." 1866 (Ridgway, Piccadilly). This volume contains various papers of more or less interest, on disinfectants, application of sewage, management of ponds and wells, the Gloucestershire Bacon-curing establishment, the culture of fruit in unheated glass structures, and others, with an account of the machinery and implements at Salisbury in the Show of 1866.

Miscellanea.

THE INVENTOR OF THE REAPING MACHINE.—At the Haddington Farmers' Club lately, the chairman stated that he had received about 700*l*. towards a testimonial to the Rev. Patrick Bell.

THE NEW EXCHANGE BUILDINGS, LIVERPOOL.—The large newsroom in the new west wing of the exchange, of which we have already given engraved views, has been completed and opened.

WATERWORKS FOR KIDDERMINSTER.—An inspection of the neighbourhood is being made with a view to finding the most eligible part for obtaining a water supply in case waterworks are established here. The estimated cost of the works is 20,000*l.* The income anticipated is 2,850*l.*; working expenses and collection, 733*l.* This, with 1,300*l.* for interest, would make 2,033*l.*, leaving a surplus profit, as estimated by the mayor, of 817*l.*

MEMORIAL OF THOMAS GRAY, THE POET.—It is proposed to erect in the church of Stoke Pogis a memorial window in honour of Thomas Gray, who lies buried in the "country churchyard" hard by, which he immortalised in his verse. A subscription has been commenced, and the committee for carrying out the proposal includes the Duke of Leeds and the Bishop of Oxford. Contributions may be sent to the Rev. Vernon Blake, Stoke Pogis Vicarage.

ST. THOMAS'S SCHOOLS, ISLINGTON.—The new schools of the district parish of St. Thomas, situated in Hemingford-road, Islington, have been opened. Earl Granville presided at the ceremonial. They have been erected from the designs of Mr. Coldwell, and will accommodate in the three chief rooms, independently of class-rooms, 600 children in attendance, and so practically provide for the education of about 1,000 children. The total cost of site and buildings is estimated at 4,200*l.*, towards which the Bishop of London's Fund has supplied 1,500*l.*; the National Society, 185*l.*; and the Privy Council, 680*l.* The subscriptions have amounted to 1,335*l.*, leaving a deficiency of about 500*l.*

THE LATE FINE ART AND INDUSTRIAL EXHIBITION AT YORK.—The guarantors of this exhibition have carried into effect the scheme foreshadowed for the disposal of the surplus which accrued from the Exhibition. They have resolved that the amount shall be invested, and be allowed to accumulate until it shall reach such a sum as, when added to expected donations, will be sufficient to erect a permanent gallery of art and industry in the city of York, and at the same time provide a home for the York School of Art. Nine or ten thousand pounds, says the local *Herald*, will probably be required before the committee will feel themselves justified in erecting any building; but, with some 2,000*l.* as a nucleus, many years ought not to elapse without the completion of the project, and we venture to say that such will be the fact.

DISTRIBUTION OF AWARDS AT THE INTERCOLONIAL EXHIBITION, MELBOURNE.—The order of procedure at the distribution was, first, the reading of a report upon the work undertaken by the jurors; then, a short reply by his Excellency, the Governor of Victoria; and, finally, the presentation by the jurors of their several lists of exhibits. This was to conclude the regular business of the day with reference to the Exhibition, but the opportunity of the presence of his Excellency and a distinguished company was taken to make a presentation of prizes to the successful competitors in the late Rifle Association matches. The commissioners of the Intercolonial Exhibition have issued a circular, addressed to the various exhibitors, requesting their assistance in "forming the nucleus of a collection of objects, adapted to further the formation of a museum." The South Kensington Museum is to be taken as the model on which it is desirable to form the projected Melbourne Industrial Museum.

ENGLISH REFRESHMENT DEPARTMENT, PARIS EXHIBITION.—The English Refreshment Department for Messrs. Bertram & Roberts, of the Crystal Palace, Sydenham, has just been completed. The interior decorations, which have been done by Messrs. J. & W. Sanders, of Guildford-street, are in the Italian Renaissance style, and the whole of the work has been executed by English workmen. The most important feature is a wall-screen, 66 ft. long by 24 ft. high, which is divided into five bays of arches on coupled columns decorated in black and gold. The bays between the columns are formed with inlaid mahogany, and filled in with panels of embossed glass, which is relieved from the mahogany by gilt mouldings. The archivolt is composed of black and gold intrados and extrados mouldings, panelled between with mahogany, inlaid with ebony and satin-wood. Over the arches a series of inlaid panels run the whole length of the screen, which is crowned by a frieze and cornice of simple design. The work was designed by Mr. W. Young, of Pimlico.

RAILWAY RETURNS.—The traffic receipts of railways in the United Kingdom amounted for the week ending March 30, on 12,745 miles, to 672,704*l.*, and for the corresponding week of last year, on 12,498 miles, to 703,516*l.*, showing an increase of 247 miles and a decrease of 30,812*l.*

PROPOSED PUBLIC HALL FOR SHEFFIELD.—A meeting of gentlemen favourable to the scheme for erecting a public hall in Sheffield has been held in the Cutlers' Hall, the mayor in the chair. The scheme has been considered by the committee and members of the Choral Union. They propose that the hall shall be in a central situation, and capable of accommodating 3,000 persons, and to cost 15,000*l.* This sum they propose to raise on the building society principle—500 shares of 30*l.* each nominal value, payable by instalments, or at the option of the shareholder. The letting of the hall, it is calculated, will realise at least 1,000*l.* a year. A committee was appointed to put the scheme into such a shape as would justify them in seeking the assistance of the public. One-fifth of the capital required would be contributed by the members of the Choral Union.

THE MAYER MEMORIAL, LIVERPOOL.—At the last meeting of the town council the proceedings of the library, museum, and education committee were read, comprising a recommendation to adopt the following resolutions, viz.—

"That the munificent donation by Mr. Joseph Mayer to the town of Liverpool of a collection of art treasures of great value, and in many respects unrivalled, requires at the hands of this corporation such an acknowledgment as shall not only mark the present public appreciation, but which may commemorate to future generations the taste and liberality which could accumulate such a collection, and the generosity which could devote it to the public benefit."

"That for this purpose a statue of Mr. Mayer be erected in St. George's Hall at the expense of this corporation, and that the library, museum, and education committee be authorised to take the necessary steps for carrying out this resolution."

Mr. Picton delivered an able and interesting speech in support of the resolutions, which were agreed to by acclamation.

A TIMBER-BORING INSECT PLAGUE IN AUSTRALIA.—A new and extraordinary insect plague is mentioned by the *Wood's Point Leader*. It says that a small species of beetle, of a most peculiar construction, arrived in myriads at the Alpine Brewery a few days before, and set to work riddling the beer-barrels. The proboscis forms an excellent gimlet, with which the little insect penetrates the hardest wood in an incredibly short time, while the hinder portion is shaped like a shovel, and is employed in getting rid of the sawdust. They make clean holes through the staves; and some of the full barrels are leaking in fifty places. In a wine-cellar thousands burrow into the wine and spirit casks. As soon as they get nearly through the wood, the liquor begins to ooze out, and the animal, of course, gets killed. Every description of box or barrel is full of them, also the doors and timber in the building. Almost every store in the township is infested with these mischievous insects. The head is red, with a proboscis somewhat resembling a parrot's bill; and the body is like a small black glass bugle broken off at the end; the whole length, one quarter of an inch.

THE ABBOT MEMORIAL SCHOOLS, GATESHEAD.—Ten sets of competitive plans for the erection of the Abbot Memorial Ragged and Industrial Schools, at Gateshead, have been on private view in the Hall of the Gateshead Mechanics' Institute. The competition originated in the offer of Mrs. Abbot to erect a ragged-school building, in memory of her late husband, and his father (of the Gateshead Iron Works), at a cost of about 2,000*l.* The sub-committee to whom the matter was entrusted offered a premium of 25*l.* for the best design,—the building to include accommodation for educating, boarding, and lodging 35 boys and 25 girls, with day schools for 300 boys and girls, master and matron's residences, workrooms, and other necessary appliances of Ragged and Industrial Schools. It was understood that no money would be expended on ornamentation, and the outlay was limited to about 2,000*l.* The lowest estimate in connexion with any of the plans sent in is, however, 2,500*l.*, and it is believed that it would take double that sum to erect a building from some of them. Nearly all have resorted to various modifications of Gothic. The competitors are Messrs. Austin & Johnston; Robert Fairbairn, of Gateshead; W. L. Moffatt, of Edinburgh; John Johnston, Thomas Oliver, S. Oswald, J. G. Varley, A. Swan, and J. E. Watson, all of Newcastle-upon-Tyne.

THE LAW COURTS DESIGNS.—Several correspondents inquire if the designs can still be seen. The exhibition is, strictly speaking, now closed to the public; but we have reason to believe that persons applying would not be refused admittance.

INDIAN JOINT-STOCK COMPANIES.—It appears from a return recently printed in the *Calcutta (Official) Gazette* that eleven joint-stock companies were registered in Bengal during the past year, with an aggregate capital of 1,164,000 rupees. During the same period twenty-four companies, possessing a total capital of 20,216,500 rupees, were wound up. Three of these latter were steam-tug associations, and a like number were established for the purpose of promoting steam-navigation.

THE WELLINGTON MONUMENT FOR ST. PAUL'S.—In the Commons Mr. J. Goldsmid asked the First Commissioner of Works when the Wellington statue for the erection of which in St. Paul's Cathedral 20,000*l.* were voted in 1858, was likely to be finished. In reply Lord J. Manners said this was more than a mere statue, and, when finished, would be one of the largest monuments erected in any church in England during the present century. It was now in a state of satisfactory progress, and there was every reason to hope that it would be completed in about two years from this time. We have, privately, a good account of the model.

SERVANTS' CLUBS.—A prize of 5*l.* is offered, through the medium of the Working Men's Club and Institute Union, for the best essay on the subject of servants' clubs. The points to be kept in view are,—1st. A history of the clubs from their commencement to the present time—their rules, and general mode of operation; 2nd a statement of the evils resulting from the present system of carrying on these clubs; and, 3rd, suggestions as to the best means of placing them on a better footing, for the benefit of the large class of persons directly interested, and for the promotion of a more satisfactory relation and understanding between employers and domestic servants; reference being made to working men's social clubs. The Earl of Shaftesbury, Mr. Hodgson Pratt, and the Rev. Henry Solly are to act as adjudicators.

PUNNING MOTTOES.—Looking over the pages of "Debrett's Illustrated Peerage," the number of families who introduce the family name into the motto borne with their arms is very noticeable. For instance, we have the Duke of Devonshire, whose family name is Cavendish, taking for his motto "Cavendo Tutus" (Safe by caution). Lord Lyveden (Vernon) takes "Vernon semper viret" which may be translated as "Vernon always flourishes;" or it might be written, *Ver-non semper viret* (Spring does not always flourish). This motto is also Lord Vernon's. Then we have Lord Byron, "Crede Byron" (Believe Byron); Lord Lyons, "Noli irritare leones" (Do not rouse the lions); the Duke of Buckingham (Temple), "Templa quam dilecta" (How beloved are thy temples!); Earl of Ellenborough (Law), "Compositum jus fasque animi" (Law and equity); the Earl of Clancarty (Le Poer Trench), "Dieu pour la Trench: qui contre?" (God for the Trench: who is against him?); Earl Fortescue, "Forte scutum salus ducum" (A strong buckler is the safeguard of generals). This motto is said to owe its origin to a Sir Richard Forte (from whom this family claim descent) having protected William the Conqueror at the battle of Hastings, by bearing a strong shield before him. The motto of Lord Fairfax is "Fare fac" (Speak and act). The barony of Fairfax, one of the oldest in the Scottish peerage, is involved in much obscurity, the residence of the present peer, as well as his brothers and sisters, being unknown. The late peer seems to have been a clerk in the Supreme Court of California. One of the best family mottoes is that of Earl Manvers, whose family name is Pierrepont, which is thus written in the motto, "Pie-repone-te" (Repose in pious confidence). In Lord Monteagle's motto the pun is on the title, the family name being Spring Rice, "Alte fert aquila" (The eagle mounts with me on high); Lord Fermoy (Roche), "Mon Dieu est ma Roche" (My God is my Rock); the Earl of Enniskillen (Cole), "Deum cole, regem serva" (Worship God, serve the king); the Earl of Abergavenny (Nevill), "Ne vile velis" (Form no mean wish); the Earl of Hopetoun (Hope), "At spes non fracta" (But my hope is not broken); the Earl of Westmorland (Fane), "Ne vile fano" (Disgrace not the altar).

THE BATTLE OF LIFE.—A clerk being needed in the office of building surveyor to the Corporation of the City of Manchester, the applicants, we are told, were 123 in number.

HOUSES FOR THE LABOURING POOR. — Mr. Ayrton having charged the Corporation of London with obstructions to this Bill, a notice of motion has been given for a "Return of the number of houses or dwellings for the labouring poor erected or adapted by the Corporation of London in the last ten years; the amonnt laid out in respect of the same; and the returns in the way of revenue up to the date of making the return." It will be shown by this return that the Corporation has already provided three blocks of buildings of this nature.

MOSAIC WORK, FULHAM PALACE. — The new chapel in Fulham Palace has just received a mosaic picture at the east end. The cartoon was made by Mr. Alexander Gibbs, of London, under the direction of the architect, Mr. Butterfield. The mosaic was executed by Salviati & Co. The subject represented is "The Adoration of the Shepherds at Bethlehem." It is treated throughout as a surface, without any attempt at perspective, so as not to interfere with the architectural idea of a solid wall. The centre figures are those of Our Lord in the manger, the Virgin Mary, and St. Joseph. The Shepherds occupy the space on either side. The drapery is in most instances diapered or fringed with gold, or colours, in a manner which adds considerably to the appearance of finish. The back-ground is blue, studded with gold stars, and relieved with horizontal lines.

PROJECTED PUBLIC WORKS IN BRISTOL.—A correspondent, signing himself "W. H.," sent an interesting communication to the *Times and Mirror*, relative to works of a public character which have been projected and are likely to be prosecuted in Bristol. After briefly referring to the various projects, he summarised their probable cost thus:—

New joint terminus	£100,000
Street improvement schemes	200,000
New Theatre Royal	15,000
New Literary Institute and Library	16,000
Improvement of river and docks	200,000
New Avonmouth Docks	300,000
New railway (under the Down)	160,000
Harbour Junction Railway	115,000
New wharf at Wapping	50,000
New Post-office	10,000
New hotel in Broad-street	35,000
Cathedral restoration, &c. (say)	15,000
New Congregational "Cathedral"	8,000
	£1,224,000

or, with the extras which attach, the sums "intended to be spent by Bristol in large and important works amount to a million and a quarter." Then, in addition to these public works, a thousand houses are being or about to be erected on Pyle-hill; a hundred houses are proposed to be built at Ashley-hill; and at Russell Town, Lawrence-hill, hundreds of houses are springing up in every direction.

THE TIME AT THE BOAT RACE.—Every one has heard by this time that the time occupied in the Oxford and Cambridge Boat Race, the other day, was taken by Benson's chronograph, but they may not know what the chronograph is. Well, then, it consists of an ordinary quick train lever movement on a scale sufficiently large to carry the hands for an 8-inch dial, and with the addition of a long seconds hand, which traverses the dial, instead of being, as usual, just above the figure six. The peculiarity of the chronograph consists in this second hand and the mechanism connected with it. The hand itself is double, or formed of two distinct hands, one lying over the other; the lower one at its extreme end is furnished with a small cup or reservoir, with a minute orifice at the bottom. The corresponding extremity of the upper hand is bent over so as to rest exactly over this puncture, and the reservoir having been filled with ink of a thickness between ordinary writing fluid and printer's ink, the chronograph is ready for action. The operator, who holds tightly grasped in his hand a stout string connected with the mechanism peculiar to this instrument, keeps a steady look out for the fall of the starter's flag. Simultaneously with the start of the race the string he holds is pulled by him, and the upper hand immediately dips through the reservoir in the lower and leaves a dot or speck of ink upon the dial. This is repeated as the boats or horses pass the winning-post, so that a lasting record is afforded by the dots on the dial of the time, exact to the tenth of a second, which is occupied in running the race.

REBUILDING CHAPELS.—Where property is held by trustees to be employed in the repairs of a chapel, and any surplus is to be distributed among the poor of the parish, the trustees are not authorised to rebuild the chapel, instead of merely repairing it, although it is in a very dilapidated condition, and unequal to the wants of the inhabitants, and the trust estate has increased very largely since its first institution. This was the decision of Vice-Chancellor Wood upon a question raised under "The Booth's Charities Act, 1846," containing provisions for the repairs and maintenance of Trinity Chapel, Salford.

VALUE OF LAND, SOUTH KENSINGTON. — Mr. Humphreys, the Middlesex coroner, and a special jury, have settled a compensation case, "Lord Kensington *v.* The Metropolitan Railway," for a piece of freehold land—the sixteenth part of an acre—at Cromwell-lane, Brompton. On one side the value was said to be about 2,000*l.*, and on the other side about 800*l.* Mr. Hawkins, Q.C., and Mr. Morgan Lloyd were for Lord Kensington; Mr. Lloyd and Mr. Holloway were for the company. The assessor reminded the jury that the value put on it on the part of Lord Kensington was about 30,000*l.* an acre, and his lordship had sold to the railway property to the amount of 150,000*l.* at the rate of 4,500*l.* an acre. The jury awarded 1,350*l.*, after an hour's deliberation.

PUBLIC-HOUSE CLOSING ACT.—From a parliamentary paper just issued, it appears that fifty-four towns have adopted the Public-house Closing Act, 1864. This Act it may, perhaps, be remembered provides that no public-house or refreshment house shall be open between the hours of one and four o'clock in the morning, unless by special permission from the local authority. The Act is compulsory within the limits of the Metropolitan Police district; but clause nine gives the power of adoption to corporate boroughs and improvement commissioners. Manchester was the first to take advantage of clause nine; and it was followed by Preston, Great Yarmouth, Birmingham, Brighton, Salford, and Liverpool. By the end of the year it had been adopted by sixteen towns. In 1865, thirty, and in 1866, eight towns took advantage of it. The Act does not apply to railway refreshment rooms.

LOCAL BOARDS OF HEALTH.—The question in the case of Hattersley *v.* Burr arose upon a conviction under the Local Government Act, 1858. A local Board had, under the 34th section of that Act, made a bye-law requiring a person intending to erect a new building to give a month's notice to the Board of his intention, and to deposit plans; and a person who had given notices commencing to build within the month, and without approval of the plans by the Board, had laid an information against him for contravening the bye-law, upon which he was convicted. The Court of Exchequer held, upon these facts, that the Board had no power to make such a proceeding an offence by their bye-laws, and that the person so giving notice had a right to commence building when he pleased, subject to the Board's right to pull down or alter his building, if built in contravention of their bye-laws.

TENDERS

Accepted for villa residence at Elloughton, Yorkshire. Mr. William Kerby, architect:—

Bricklayer and Plasterer's Work.			
Kirby	£350	0	0
Mason's Work.			
Wilson	125	0	0
Carpenter and Joiner's Work.			
Curtis	200	0	0
Slater's Work.			
Dawber & Son	29	10	0
Plumber, Glazier, Painter, and Ironmonger's Work.			
Halliday	131	10	0

Accepted for National School at North Ferriby, Yorkshire. Mr. William Kerby, architect:—

Bricklayer and Plasterer's Work.			
Kirby	£139	0	0
Mason's Work.			
Heron	94	0	0
Carpenter, Plumber, Glazier, Painter, and Ironmonger's Work.			
Browne	316	0	0

For works at Baker-street, Enfield, for Alderman Challis. Mr. Thomas J. Hill, architect:—

Patman, Brothers	£510	0	0
Cushing	490	0	0
Fairhead	445	0	0

For works at Tottenham, for Mr. W. Robinson. Mr. Thomas J. Hill, architect:—

Anley	£1,028	0	0
Sabey	985	0	0
Bayes	900	0	0
Chapman	895	0	0
Patman, Brothers	848	0	0

For additions and alterations to 64, Harley-street. Mr. C. Eales, architect:—

Stevenson & Watson	£1,775	0	0
Brown	1,650	0	0
Clemence	1,548	0	0
Clarke & Mannooch	1,507	0	0
Phillips	1,498	0	0
Saunders	1,462	0	0
Scrivener & White	1,428	0	0

For building a public house in the Albert-road, Peckham, for Messrs. Day, Noakes, & Sons. Mr. Elkington, architect:—

Shapley & Webster	£1,398	0	0
Eustace	1,393	0	0
Tarrant	1,379	0	0

For repairs and decorations of the interior of Stranraar House, Maida Hill. Mr. Francis Cadogan, architect:—

Bracher & Son	£300	0	0
Sykes	257	0	0
Goodwin (accepted)	215	0	0

For four semi-detached villas at Leyton, Essex. Mr. W. A. Longmore, architect:—

Winter	£1,676	0	0
Hedges	1,584	0	0
Gibling	1,250	0	0
Elms (accepted)	1,240	0	0

For building lodges, gateways, entrances, and enclosing Finsbury and Southwark Parks. Quantities supplied by Messrs. Rake & Ranwell in conjuction with Messrs. Curtis & Son:—

Foster (accepted) Southwark	£3,950	0	0
" " Finsbury	3,100	0	0

For alterations and additions to St. Peter's Schools, Southwark. Messrs. Strudwick & Mennie, architects:—

Brass (accepted)	£1,083	0	0

For building new retort-house for the West Ham Gas Company. Mr. E. H. Thorman, engineer:—

		Old Materials.
Ashby & Sons	£3,523	£90
Munday	3,511	167
Rivett	3,493	160
Perry & Co.	3,237	110
Hedges	3,060	—
Hill & Keddell	3,124	30
Ennor	3,168	200

For erecting a house in the London-road, Enfield, for Mr. Easter. Mr. F. G. Widdows, architect:—

Bayes	£1,150	0	0
Fairhead	1,115	0	0
Patman, Brothers	1,067	0	0
Field & Sons	900	0	0

For alterations to No. 89, Bishopsgate-street, for Messrs. Jackson & Townson. Mr. F. G. Widdows, architects:—

Axford & Whillier	£563	0	0
Ashby & Sons	494	0	0
Ennor	480	0	0
Child & Son	425	0	0

For new brewery at Maidenhead, for Mr. W. Nicholson. Mr. C. Cooper, architect:—

Vickery	£2,689	15	0
Woodbridge	2,627	10	0
Silver & Son (accepted)	2,589	0	0

For works at 81 and 83, City-road. Mr. Thomas J. Hill, architect:—

Anley	£487	0	0
Perry	480	0	0

For new porch at All Saints' Church, Wistow, near Selby. Mr. William Kerby, architect:—

	Lead Roof.	Slate Roof.
Tiplady	£135 14 0	£124 2 6
Padbury (accepted)	112 12 0	104 12 0

TO CORRESPONDENTS.

J. W. W. (a good floor can be made with Portland cement).—Soap and alum to keep wet out of walls (if we attended to all requests we should have to repeat this recipe every week. Inquirers must look back for themselves).—P. H. N. (cancelled; having appeared elsewhere).—N. & B. (send your own particulars).—J. L. (if an architect charge only for his drawings he would be obliged to deliver those drawings to the proprietor before he could recover).—J. G. (next week).—Chatham (ditto).—W. G. P. (send name).—Robbers (most of the matter in the Trade paper named is stolen. Even the copy sent contains four articles taken from our columns without the slightest acknowledgment).—W. B.—G. S.—G. M.—B. E. W.—S. B.—Mrs. B.—A. M.—P. C.—T. P. W.—J. W.—W. H. W.—W. K.—F.—Messrs. F.—Constant Reader—X. Y. Z.—T. R.—S. & M.—W. C. G.—J. B.—B. & Son.—W. A. L.—A Pedestrian.—J. G. N.—C. F. H.

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